bart
impact
program

Land Use and Urban Development Project

STUDY OF THE HOUSING INDUSTRY

working paper

The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. Finally, the findings will be interpreted with regard to their implications for the planning of transportation and urban development in the Bay Area and other metropolitan areas.

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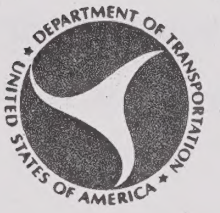
BART IMPACT PROGRAM

LAND USE AND URBAN DEVELOPMENT PROJECT

STUDY OF THE HOUSING INDUSTRY



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WORKING PAPER

PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION

AND

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

NOTICE

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A JOINT VENTURE

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16. Abstract

This working paper addresses BART's effects on the housing industry in nine areas: Daly City-Pacifica, Mission District, Fruitvale, Walnut Creek, Hayward, Fremont-Union City, Pittsburg-Antioch, Richmond, and East Oakland. Changes in housing supply and demand during the period 1962-76 are analyzed using building permit records, bank loan disclosure statements, BART Passenger Profile Survey data, and aerial photographs, supplemented by key informant interviews with residential developers, apartment managers, planning directors, and others knowledgeable about the housing market. The relationship between these findings and other topics yet to be addressed in the Land Use and Urban Development Project also is examined.

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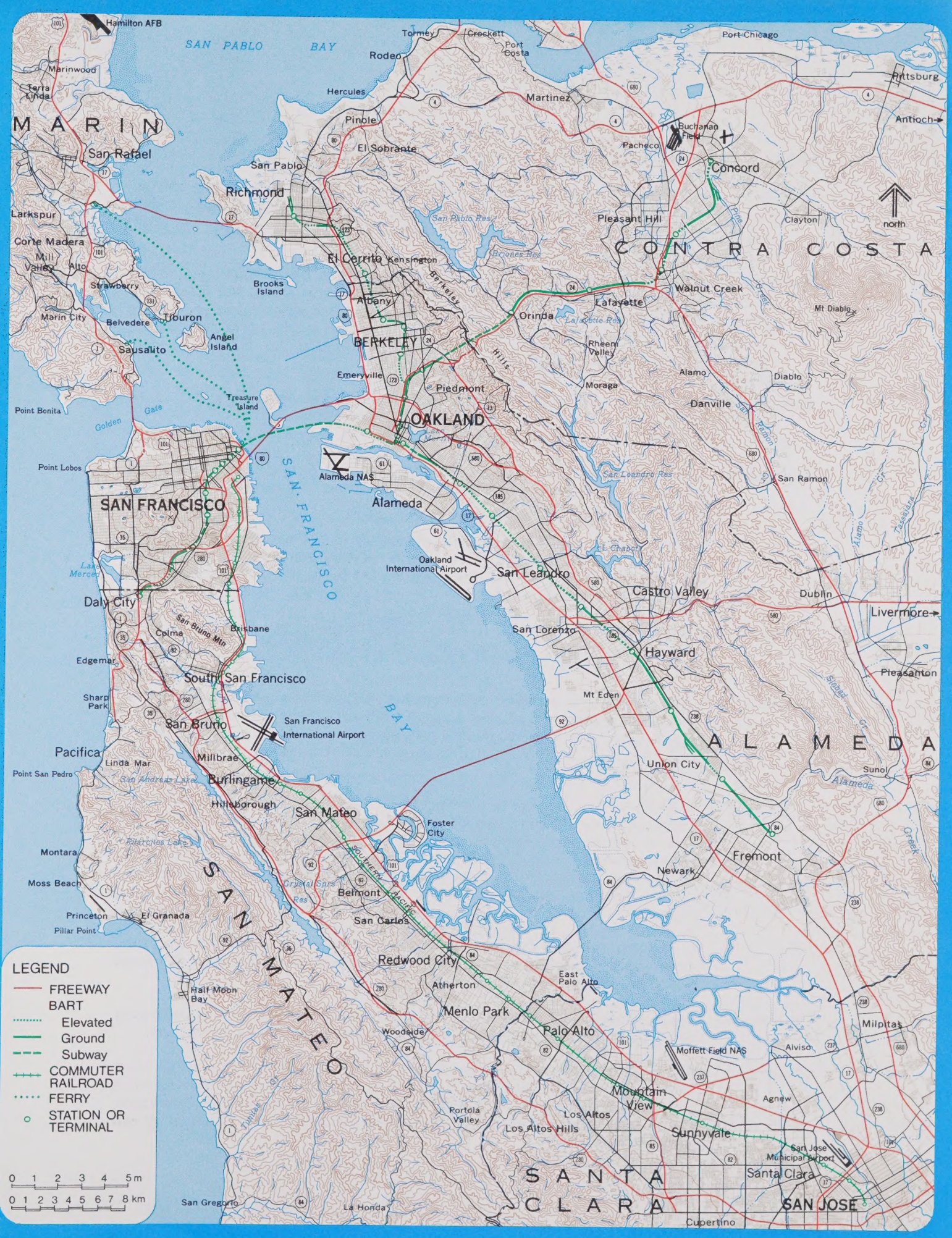

SAN FRANCISCO BAY REGION

CENTRAL AREA

Metropolitan Transportation Commission

BART: The Bay Area Rapid Transit System

Length: The 71-mile system includes 20 miles of subway, 24 miles on elevated structures and 27 miles at ground level. The subway sections are in San Francisco, Berkeley, downtown Oakland, the Berkeley Hills Tunnel and the Transbay Tube.

Stations: The 34 stations include 13 elevated, 14 subway and 7 at ground level. They are spaced at an average distance of 2.1 miles: stations in the downtowns are less than one-half mile apart, while those in suburban areas are two to four miles apart. Parking lots at 23 stations have a total of 20,200 spaces. There is a fee (25 cents) at only one of the parking lots. BART and local agencies provide bus service to all stations.

Trains: Trains are from 3 to 10 cars long. Each car is 70 feet long and has 72 seats. Top speed in normal operations is 70 mph with an average speed of 36 mph including station stops. All trains stop at all stations on the route.

Automation: Trains are automatically controlled by the central computer at BART headquarters. A train operator on board each train can override automatic controls in an emergency.

Magnetically encoded tickets with values up to $20 are issued by vending machines. Automated fare gates at each station compute the appropriate fare and deduct it from the ticket value. At least one agent is present at each station to assist patrons.

Fares: Fares range from 25 cents to $1.45, depending upon trip length. Discount fares are available to the physically handicapped, children 12 and under, and persons 65 and over.

Service: BART serves the counties of Alameda, Contra Costa and San Francisco, which have a combined population of 2.4 million. The system was opened in five stages, from September 1972 to September 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.

Routes are identified by the terminal stations: Daly City in the West Bay, Richmond, Concord and Fremont in the East Bay. Trains operate from 6:00 a.m. to midnight on weekdays, every 12 minutes during the daytime on three routes: Concord-Daly City, Fremont-Daly City, Richmond-Fremont. This results in 6-minute train frequencies in San Francisco, downtown Oakland and the Fremont line where routes converge. In the evening, trains are dispatched every 20 minutes on only the Richmond-Fremont and Concord-Daly City routes. Service is provided on Saturdays from 9 a.m. to midnight at 15-minutes intervals. Future service will include a Richmond-Daly City route and Sunday service. Trains will operate every six minutes on all routes during the peak periods of travel.

Patronage: Approximately 142,000 one-way trips are made each day. Approximately 200,000 daily one-way trips are anticipated under full service conditions.

Cost: BART construction and equipment cost $1.6 billion, financed primarily from local funds: $942 million from bonds being repaid by the property and sales taxes in three counties, $176 million from toll revenues of transbay bridges, $315 million from federal grants and $186 million from interest earnings and other sources.

March 1978

PREFACE

The BART Impact Program (BIP) is a comprehensive policy-oriented effort to identify, describe, measure, and present findings as accurately as possible about the multi-faceted impacts of a major public transportation investment -- the BART system. The major objective of the Land Use and Urban Development Project is to determine how and to what extent BART has influenced the spatial arrangements of people and activities within the San Francisco Bay Area. To accomplish this task, the project will focus on the way BART has influenced (1) location decision processes; (2) actual movement behavior that results from those decisions and other market forces; and (3) the form, character, and functioning of aggregate spatial groupings that represent the net outcome of those decisions and movement patterns. Changes attributable to BART will be measured against pre-BART and no-BART alternatives. In all of these studies, BART's effects on individual socio-economic groups, particularly minorities and the disadvantaged, will receive careful attention.

The Land Use and Urban Development Project is one of six major projects comprising the BART Impact Program. The others are:

- Economics and Finance Project (E&F)
- Environmental Project (Env)
- Institutions and Lifestyles Project (ILS)
- Public Policy Project (PP)
- Transportation System and Travel Behavior Project (TSTB)

Each of these projects is designed to investigate specific aspects of BART's impacts, to explain why the impacts occur, and to identify who is affected by the impacts and the distributional effects. The projects then will demonstrate how the information derived can be used by decision-makers to enhance the benefits and to reduce the dis-benefits of BART, and to increase understanding of the potential impacts of rail transit investments in the Bay Area and other American metropolitan areas.

This working paper presents the analysis and findings of the study of BART's impact on the Bay Area housing industry -- one aspect of BART's land use impacts. The paper is presented for review by BART Impact Program staff, federal sponsors, and other interested planners and researchers.

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SUMMARY

OBJECTIVES

The objectives of the study of the housing industry were (1) to determine BART's effect on construction of new housing by market sub-area and distance from a BART station, the type and price of housing, and project size; and (2) to determine BART's effects on the existing housing stock in terms of maintenance, rehabilitation, and abandonment decisions.

METHOD

BART's effects on the housing industry were examined in nine areas: Daly City-Pacifica, Mission District, Fruitvale, Walnut Creek, Hayward, Fremont-Union City, Pittsburg-Antioch, Richmond, and East Oakland. This analysis traced housing construction and rehabilitation trends over the period 1962-76 in target neighborhoods and specific housing submarkets, taking into account (a) the stratification of the real estate market, (b) preferences of different types of households for specific locations, (c) land availability, and (d) utilities constraints such as water or sewer connection rationing.

Information on changes in housing supply and demand relationships by sub-area and BART's potential influence on the industry gleaned from statistical analysis of building permit records was supplemented by key informant interviews with realtors, developers, apartment managers, lenders, planners, and local officials.

FINDINGS

HYPOTHESIS 1. BART has added impetus to construction of new housing in areas where it provides greatest improvement in transit accessibility to downtown San Francisco and Oakland.

Our findings indicate that BART has affected the housing industry, but not to the extent originally expected. BART has provided some impetus to construction of new housing in areas in outlying, suburban communities where it provides improved accessibility to downtown San Francisco and Oakland, but to a large degree, particularly in central Contra Costa County, these communities already were in the path of urban development. Six of the 26 developers interviewed indicated that BART influenced their location decisions within specific areas and subsequently improved their sales. Analysis of building trends and key informant interviews, at least in the Pittsburg-Antioch and Union City-Fremont housing markets, suggests that BART has caused a net increase in the amount of new housing over what would have been built in the absence of BART, but central Contra Costa County and Daly City-Pacifica housing construction volumes have not been measurably affected.

HYPOTHESIS 2. **BART has induced single family residential development beyond outlying stations in areas previously perceived as beyond commute distance from downtown Oakland and San Francisco by most potential buyers.**

Analysis of passenger profile data and key informant interviews suggests that BART has attracted people to areas previously perceived as beyond commute distance from the central business districts of San Francisco and Oakland. Developers, in turn, have responded to this locational shift in housing demand. However, the growing shortage of developable land on the Bay plain coupled with the continuing preference for single family housing and completion of several major improvements to the regional highway system over the past 15 years has made residential development in these outlying areas inevitable, with or without BART. Thus, at a regional scale BART should be viewed as a relatively unimportant factor in suburbanization, primarily affecting timing and locational decisions.

HYPOTHESIS 3. **BART has induced residential rehabilitation and redevelopment in older neighborhoods adjacent to stations.**

HYPOTHESIS 4. **In minority neighborhoods adjoining BART, BART has created less impetus for rehabilitation or additions to the housing supply than in white neighborhoods with similar development potential adjoining BART stations.**

In older urban areas in San Francisco, Oakland, and Richmond, rehabilitation activity in residential neighborhoods adjacent to BART stations is far lower than in comparable areas one to three miles away, according to 1975 and 1976 bank disclosure statements of home improvement loans by census tract. (Differences between minority and non-minority neighborhoods could not be quantified.) Station area loan activity was one-third the neighborhood average in San Francisco's Mission District and downtown Richmond, and one-sixth of the areawide average in Oakland's Fruitvale District. However, in these communities the station areas contain both commercial and residential land uses, and much of the land is zoned for commercial use. Thus, the case for extensive residential rehabilitation, even in the absence of BART, would be weak. Nonetheless, these measures, as confirmed by key informant interviews with building inspectors, suggest that close proximity to BART is not viewed as a sufficient incentive for owners of older, possibly deteriorating housing to renovate their buildings in order to cater to the housing needs of BART riders.

HYPOTHESIS 5. **BART-induced construction within walking distance of BART stations is at higher densities than would have occurred without BART.**

Within station areas, BART has not induced residential construction at a higher density than would have occurred without BART because the apartment market does not (at least not yet) recognize any premium for locations within walking

distance to BART. In some instances, developable land within the station areas has been rezoned to prohibit high density development in response to community opposition to expected pressures for apartment development. In other station areas zoned for high density residential use, construction of townhouses, condominiums, or rented apartments generally has not been feasible from an economic standpoint, given current construction costs, obtainable sales prices and rents, and potential residents' reluctance to live at such densities. One notable exception is a proposed 712 unit project around the Fremont BART station -- the first phase of which is scheduled for completion in 1978 or early 1979. If this project is successful, it may provide a good model for other BART-oriented developments.

HYPOTHESIS 6. **Residential developers tend to locate new housing and apartments away from areas in which BART produces noise, visual, and other adverse environmental impacts.**

Along both at-grade and elevated BART tracks on the Fremont line where train noise exceeds community noise levels -- a total of eight miles south of the Lake Merritt station -- no residential development has occurred on vacant developable land adjacent to BART since 1965. At least five major developers have been influenced in their development decisions by potential noise impacts of BART. Informants cited several instances where property owners have had difficulty selling land adjacent to BART in part because of the high costs of meeting state and federal residential noise standards which would require special insulation to reduce interior noise.

HYPOTHESIS 7. **Residential developers tend to locate new housing and apartments near BART in response to attitudes and expectations generated by BART planning and publicity.**

Some residential developers have tended to build near BART in response to attitudes and expectations generated by BART planning and publicity, but most have not. For the most part, those influenced by BART were responding to pronouncements that BART would increase housing demand, and in our interviews these people indicated a willingness to pay a $500 to $5,000 per unit premium to build near BART, even though such increased costs are not justified in today's market. Two notable examples recently built near the Walnut Creek BART station are the 800-unit Diablo Keys project and the 340-unit Stoneridge Apartments. Both of these were designed to appeal to young couples and single people working in San Francisco. As an indication of the developers' reliance on this market, delays in starting transbay BART service to San Francisco adversely affected their marketing plans.

POLICY IMPLICATIONS

The findings of this study of BART's effects on the housing industry suggest the following policy implications.

First, rail rapid transit by itself will not cause residential development to cluster around suburban stations. Supportive land use policy is necessary. More importantly, if local communities desire development, they should negotiate zoning and other conditions of approval with developers to make transit-oriented development feasible from an economic standpoint. As examples, relaxing parking space requirements and sharing costs for pedestrianways to facilitate station access represent two possible concessions that might lower a developer's costs sufficiently to make a station-area project viable and attractive from a marketing perspective.

Second, high density zoning intended to encourage private redevelopment and intensification of use in residential neighborhoods rarely creates sufficient incentives for transit-oriented development when market forces do not make it economically feasible. Such policies probably should be limited to areas of substantial housing deterioration and blight. But even in these cases, well funded neighborhood conservation programs or public redevelopment may be preferred, and should be justified on the basis of social, economic, and environmental policies and objectives, not just as a transit-supporting land use policy.

Third, planners and decision-makers should not expect any transit-oriented development, even under optimistic assumptions, until after construction has begun. Most developers will wait for the opening of service. In anticipation of this, opportunities for cooperative land use planning and development programming should be pursued during the early planning and design stages.

Fourth, the impacts of train noise should be reflected in local land use and zoning policies by establishing buffer zones along at-grade and aerial trackways through residential areas, or requiring installation of barriers or other mitigation measures. Routes through non-residential areas or within shared rights of way should be favored from a land use planning perspective. In fact, given the increased awareness of noise today and the requirements of environmental review and noise abatement legislation, noise impacts are likely to be scrutinized far more carefully in future transit planning than they were during the initial BART planning and design.

Finally, because rail transit may affect corridor development trends to some extent, local communities should be encouraged to adopt growth management strategies to avoid school impaction or overloaded public services and facilities resulting from unanticipated increases in housing construction. Although this was not an impact specifically attributed to BART in any of the communities studied, it could become an issue elsewhere, particularly if service began in a strong housing market. (BART's opening of service coincided with the 1973-74 recession which significantly depressed housing construction.)

1. INTRODUCTION

BART originally was envisioned as embodying both transportation benefits and non-transportation benefits in the Bay Area. Among its non-transportation benefits, BART was expected to "maintain and encourage profitable concentrations of business and industry and lessen disorganized sprawl."[1] These and related expectations justify examining land use and urban development impacts as part of the BART Impact Program. The Land Use and Urban Development (LU&UD) Project has been designed to address all aspects of development that BART may have affected or potentially could affect -- workplace and residence location decisions, impacts on minorities, retail trade trends, property values and rents, and office and other commercial construction. The project focuses on four issues:

-- What changes does BART produce in land use and urban development in station areas and throughout the region?

-- Why do these impacts occur?

-- Who is affected by these impacts?

-- How can BART's adverse effects be minimized or eliminated and its positive impacts be maximized to secure the greatest public benefit?

Eighteen closely related work elements constitute the LU&UD Project. This working paper summarizes all analyses and findings emerging from Work Element 5, Study of the Housing Industry. The primary objectives of Work Element 5 were:

1. To determine BART's effect on the construction of new housing by market sub-area, distance from a BART station, project size, type, and price; and

2. To determine BART's effect on the existing housing stock in terms of maintenance, rehabilitation, and abandonment decisions.

Analyses and findings relevant to these objectives are presented in the three chapters to follow. The first chapter delineates the research questions — hypotheses about BART's impact — and study design for Work Element 5, including the technical details associated with data collection and tests of specific hypotheses. The second chapter reports findings for each hypothesis. The final chapter presents conclusions emerging from Work Element 5, together with the implications for future public actions.

1. Parsons, Brinckerhoff, Tudor, Bechtel, Composite Report - Bay Area Rapid Transit (May 1962), p. 76.

2. RESEARCH QUESTIONS AND STUDY DESIGN

In Work Element 5 BART's effects on the housing industry are examined in Daly City-Pacifica, the Mission District in San Francisco, the Fruitvale District in Oakland, East Oakland, Richmond, Walnut Creek, Hayward, Union City-Fremont, and Pittsburg-Antioch (see Figure 1). Though the LU&UD Project is concerned with development activity throughout the three-county BART service area, available resources precluded study of the housing industry in all communities BART serves. The nine study areas were selected because they were believed to represent the range of conditions likely to be found. The nine areas encompass significant variations in racial composition, household income, age of housing stock, proximity to major employment centers, and other key variables. Additionally, four of the nine study areas -- the Mission District, Richmond, Walnut Creek, and Fremont -- have been selected for intensive, program-wide case studies of BART's impacts (Work Element 16). The objectives, methodology, and limitations of Work Element 5 are addressed in the forthcoming sections.

OBJECTIVES

The primary objectives of Work Element 5 were to determine (1) BART's effects on the construction of new housing and (2) BART's effects on the existing housing stock. In a manner consistent with the analysis format for all work elements, the above objectives were translated into a set of research hypotheses. By confirming or denying the hypotheses, the objectives are fulfilled. In Work Element 5, the following seven hypotheses were tested:

1. BART has added impetus to construction of new housing in areas where it provides the greatest improvement in transit accessibility to downtown San Francisco and Oakland.

2. BART has induced single family residential development beyond outlying stations in areas previously perceived as beyond commute distance from downtown Oakland and San Francisco by most potential buyers.

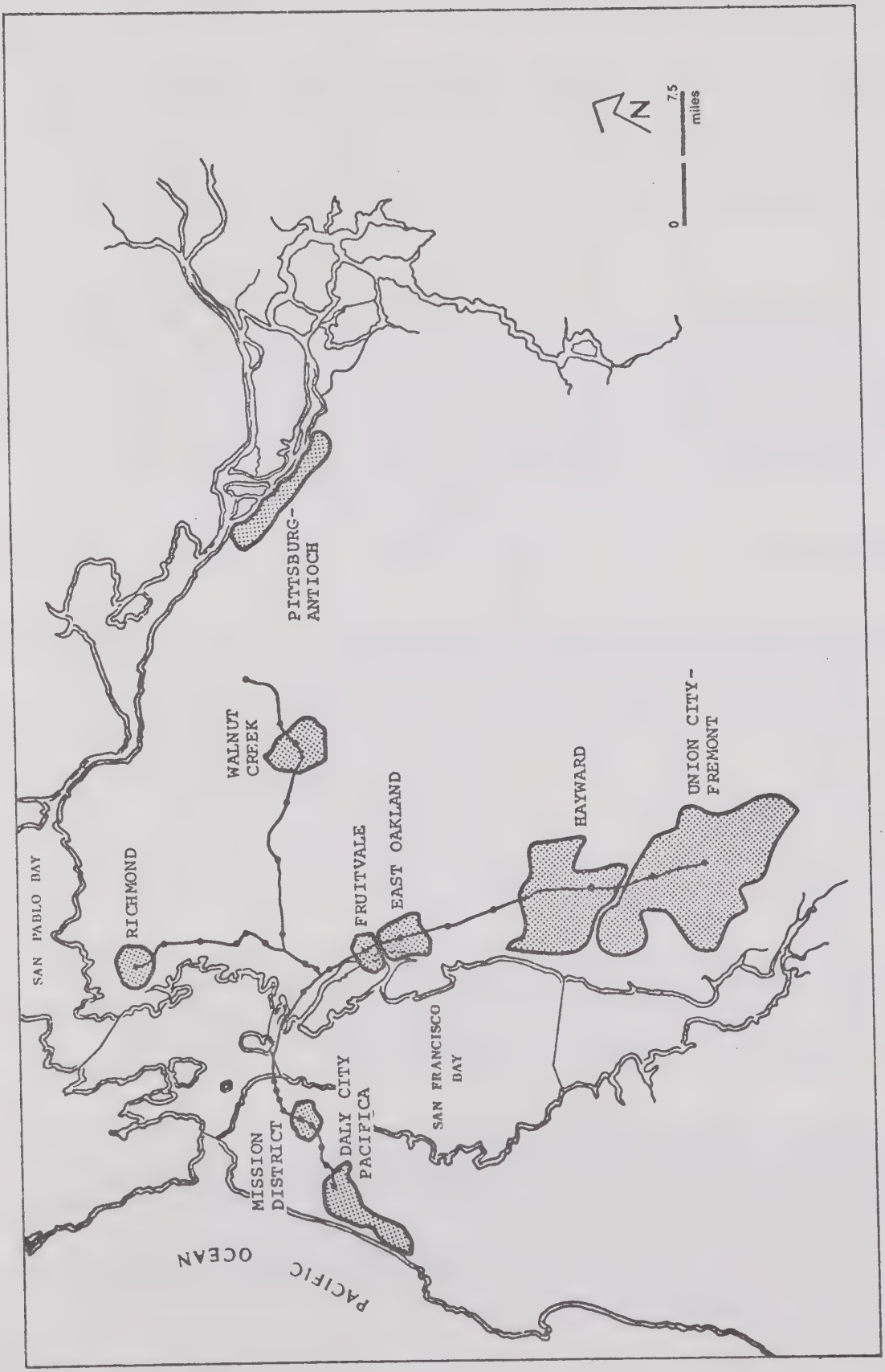
3. BART has induced residential rehabilitation and redevelopment in older residential neighborhoods adjacent to stations.

4. In minority neighborhoods adjoining BART, BART has created less impetus for rehabilitation or additions to the housing supply than in white neighborhoods with similar development potential adjoining BART stations.

5. BART-induced construction within walking distance of stations is at higher densities than would have occurred without BART.

6. Residential developers tend to locate new housing and apartments away from areas in which BART produces noise or visual and other adverse environmental impacts.

FIGURE 1. WORK ELEMENT 5 STUDY AREAS



7. Residential developers tend to locate new housing and apartments near BART in response to attitudes and expectations generated by BART planning and publicity.

These hypotheses build on the LU&UD Project's theoretical framework for assessing BART's impacts, a theoretical framework keyed to BART's attributes.[2] The attributes of the BART system -- such as its transportation service and physical facilities, its resource consumption and publicity — influence locational decisions by individuals and businesses. The social and economic consequences that result are the ultimate concern of the study.

As an example of the manner in which the Work Element 5 hypotheses emerge from the above framework, an important attribute of BART is improved travel conditions (in terms of speed, comfort, safety, cost, etc.) along certain corridors as compared to the No-BART Alternative (NBA) defined by MTC as the 1971 transportation system with minor improvements in bus service.[3] Accessibility mapping (Work Element 2) measured the gains. BART's improved service should influence decisions on the locations of new residential structures. Therefore, Hypotheses 1 and 2 posit that new residential development has been stimulated in areas where BART has significantly improved accessibility.

METHODOLOGY

In Work Element 5, housing construction and rehabilitation trends over the period 1962-1976 were analyzed to identify and then isolate BART's effects. To the extent possible, each of the seven hypotheses was tested in each of the nine study areas. Moreover, a number of testing procedures were applied to each hypothesis in each study area. Work Element 5 findings thus emerge from hypothesis-specific test results confirmed both in different study areas and by alternative analytical procedures.

The Study Areas

As the following descriptions illustrate, the nine Work Element 5 study areas represent a broad spectrum of urban development characteristics ranging from older urban inner city residential neighborhoods to outlying loosely built suburban communities. Residential land use, average density (housing units per acre), and development opportunities in each study area in 1975 are summarized in

2. John Blayney Associates/David M. Dornbusch & Co., Inc., A Joint Venture, Land Use and Urban Development Project Study Design and Project Implementation Plan, (DOT-OS-30176, Metropolitan Transportation Commission, Berkeley, California, March, 1977), pp. 2-5.

3. Metropolitan Transportation Commission, Rationale and Specification for the No-BART Alternative (Berkeley: BART Impact Program Working Note, September 11, 1976).

Table 1. The acreage available for development, which excludes lands zoned exclusively for industrial use, is an indication of the extent to which each area is approaching full development. The study area zones are keyed to the 440 zone system established by MTC and the Association of Bay Area Governments (ABAG). These relate to, but do not correspond with, city boundaries. In the time series analyses of building permits, records compiled for cities were used.

Daly City-Pacifica: BART's Daly City line terminates just south of the San Francisco city limit, serving Daly City and Pacifica (6 miles south of the station). Patronage (8,100 riders entering or exiting the station on a typical day) also is attracted from Colma, South San Francisco, San Bruno, and other northern San Mateo County communities. Both Daly City and Pacifica are developed mainly with modest single family homes (Daly City 71 percent single family units and Pacifica 88 percent in 1970), although Daly City has the highest density single family housing in the Bay Area outside San Francisco. Daly City's population consistently has been twice that of Pacifica's population over the last two decades, explained at least in part by Daly City's greater proximity to San Francisco and by Pacifica's severe topographical constraints on development. Daly City had a population of 45,000 in 1960; 67,000 in 1970; and 73,100 in 1977. Pacifica had a population of 21,000 in 1960; 36,000 in 1970; and 37,300 in 1977. The average annual rate of increase between 1960 and 1970 for Daly City was 4.1 percent versus 5.6 percent for Pacifica; the average annual rate of increase between 1970 and 1977 was 1.3 percent for Daly City and 0.5 percent for Pacifica. Median family incomes in Daly City and Pacifica in 1970 were above the San Francisco-Oakland SMSA median -- i.e., $10,786 in Daly City and $12,013 in Pacifica, versus $8,803 in the SMSA. The 1970 median housing values, in contrast, were at or below the SMSA average: $26,900 for Daly City and $24,500 for Pacifica, versus $26,900 for the SMSA. Black and Spanish surname persons were 22.3 percent of the SMSA's 1976 population compared with 24.1 percent in Daly City and 16.1 percent in Pacifica.

Mission District: San Francisco's Mission District is served by two BART subway stations -- 16th Street and 24th Street (with a combined daily patronage of 5,500). The Mission District, bordered on two sides by industrial and commercial areas, consists mainly of old, high coverage, medium-high density housing. More than 80 percent of the housing units were built before 1940. Eighty percent of the households are renters and 83 percent of all units are in multi-family dwellings. More than half of the Mission's 90,000 residents are of minority identity, the largest single group being Spanish speaking or Spanish surname. Incomes and housing values are low to moderate. In the last few years buyers from outside the Mission District have rehabilitated older dwellings in many neighborhoods for their own use or for re-sale, according to key informants (see Appendix A for list of those interviewed).

Fruitvale: Fruitvale, served by an aerial structure BART station with daily patronage of 2,900, is classified as one of Oakland's poverty areas. On the Bay side of East 14th Street the area surrounding the BART station is mainly commercial and industrial. On the upland side of East 14th are 9,000 small, single-family dwellings interspersed with 10,500 low density, multi-family units. Pre-World War II housing is 60 percent of the stock. In 1970, just over one-fourth

TABLE 1. HOUSING INDUSTRY STUDY AREAS: RESIDENTIAL LAND USE AND DEVELOPMENT OPPORTUNITIES, 1975

Outlying Communities	MTC Zones	Housing Units	Residential Acreage	Density (HUs/acre)	Developable Acreage	Percent of Total Acreage
Daly City	361-365	27016	1863	14.5	160	2.4
Pacifica	346-349, 359,360	23542	2969	7.9	3843	28.7
Total		50558	4832	10.5	4003	20.1
Hayward	185,189, 191-193	18094	2439	7.4	794	10.9
Union City	194	8632	1756	4.9	424	6.7
Fremont	195-204	41714	6373	6.5	5818	9.6
Total		50346	8129	6.2	6242	9.3
Walnut Creek	86,88,94, 98,99	24155	3753	7.4	2981	13.8
Pittsburg/Antioch	73-79	22766	3388	6.7	5303	21.9
Urban Residential Areas						
Mission	386,387	13087	176	74.4	-0-	--
Richmond	118	5254	506	10.4	-0-	--
Fruitvale	159-161	16204	1050	15.4	-0-	--

Source: ABAG Series III Projections, 1977

Table 1. The acreage available for development, which excludes lands zoned exclusively for industrial use, is an indication of the extent to which each area is approaching full development. The study area zones are keyed to the 440 zone system established by MTC and the Association of Bay Area Governments (ABAG). These relate to, but do not correspond with, city boundaries. In the time series analyses of building permits, records compiled for cities were used.

Daly City-Pacifica: BART's Daly City line terminates just south of the San Francisco city limit, serving Daly City and Pacifica (6 miles south of the station). Patronage (8,100 riders entering or exiting the station on a typical day) also is attracted from Colma, South San Francisco, San Bruno, and other northern San Mateo County communities. Both Daly City and Pacifica are developed mainly with modest single family homes (Daly City 71 percent single family units and Pacifica 88 percent in 1970), although Daly City has the highest density single family housing in the Bay Area outside San Francisco. Daly City's population consistently has been twice that of Pacifica's population over the last two decades, explained at least in part by Daly City's greater proximity to San Francisco and by Pacifica's severe topographical constraints on development. Daly City had a population of 45,000 in 1960; 67,000 in 1970; and 73,100 in 1977. Pacifica had a population of 21,000 in 1960; 36,000 in 1970; and 37,300 in 1977. The average annual rate of increase between 1960 and 1970 for Daly City was 4.1 percent versus 5.6 percent for Pacifica; the average annual rate of increase between 1970 and 1977 was 1.3 percent for Daly City and 0.5 percent for Pacifica. Median family incomes in Daly City and Pacifica in 1970 were above the San Francisco-Oakland SMSA median — i.e., $10,786 in Daly City and $12,013 in Pacifica, versus $8,803 in the SMSA. The 1970 median housing values, in contrast, were at or below the SMSA average: $26,900 for Daly City and $24,500 for Pacifica, versus $26,900 for the SMSA. Black and Spanish surname persons were 22.3 percent of the SMSA's 1976 population compared with 24.1 percent in Daly City and 16.1 percent in Pacifica.

Mission District: San Francisco's Mission District is served by two BART subway stations -- 16th Street and 24th Street (with a combined daily patronage of 5,500). The Mission District, bordered on two sides by industrial and commercial areas, consists mainly of old, high coverage, medium-high density housing. More than 80 percent of the housing units were built before 1940. Eighty percent of the households are renters and 83 percent of all units are in multi-family dwellings. More than half of the Mission's 90,000 residents are of minority identity, the largest single group being Spanish speaking or Spanish surname. Incomes and housing values are low to moderate. In the last few years buyers from outside the Mission District have rehabilitated older dwellings in many neighborhoods for their own use or for re-sale, according to key informants (see Appendix A for list of those interviewed).

Fruitvale: Fruitvale, served by an aerial structure BART station with daily patronage of 2,900, is classified as one of Oakland's poverty areas. On the Bay side of East 14th Street the area surrounding the BART station is mainly commercial and industrial. On the upland side of East 14th are 9,000 small, single-family dwellings interspersed with 10,500 low density, multi-family units. Pre-World War II housing is 60 percent of the stock. In 1970, just over one-fourth

TABLE 1. HOUSING INDUSTRY STUDY AREAS: RESIDENTIAL LAND USE AND DEVELOPMENT OPPORTUNITIES, 1975

Outlying Communities	MTC Zones	Housing Units	Residential Acreage	Density (HUs/acre)	Developable Acreage	Percent of Total Acreage
Daly City	361-365	27016	1863	14.5	160	2.4
Pacifica	346-349, 359,360	23542	2969	7.9	3843	28.7
Total		50558	4832	10.5	4003	20.1
Hayward	185,189, 191-193	18094	2439	7.4	794	10.9
Union City	194	8632	1756	4.9	424	6.7
Fremont	195-204	41714	6373	6.5	5818	9.6
Total		50346	8129	6.2	6242	9.3
Walnut Creek	86,88,94, 98,99	24155	3753	7.4	2981	13.8
Pittsburg/Antioch	73-79	22766	3388	6.7	5303	21.9
Urban Residential Areas						
Mission	386,387	13087	176	74.4	-0-	--
Richmond	118	5254	506	10.4	-0-	--
Fruitvale	159-161	16204	1050	15.4	-0-	--

Source: ABAG Series III Projections, 1977

of the population was black, the majority of which was in the low and moderate income categories. Since 1970, the proportion of black households has been increasing.

East Oakland: To the south of Fruitvale the aerial Coliseum station (2,000 daily riders) serves East Oakland. East Oakland's housing stock is similar to Fruitvale's except for a higher percentage of single family dwellings (74 percent) and a smaller share of housing built before 1940 (26 percent). In 1970, approximately 85 percent of East Oakland's 30,200 residents were black. The station was located to serve the Oakland-Alameda County Coliseum complex built in the mid-1960s that draws crowds as large as 60,000 to sports and entertainment events. There is little housing near the station, but in 1973 there were about 3,000 jobs within walking distance.

Richmond: The station terminating the Richmond line (1,500 riders daily) was located between the downtown retail area and the Civic Center with the intent of serving both. It is entered from the depressed Nevin pedestrian mall that links parking lots on either side of the at-grade tracks.

Loss of retail potential to the Hilltop shopping center has made disposition of the 107 acres in the Downtown Redevelopment Project difficult, and most of the land remains vacant. The major new element is a Social Security Administration Center with 2,000 employees.

To the north and east of the station are neighborhoods of small single family homes interspersed with some low density apartments built mainly in the 1940s and 1950s. In 1970, these neighborhoods were less than 10 percent black, while the neighborhoods to the west and south were more than 75 percent black. The 1975 special census shows an increase in black occupancy north and east of the station. About 75,000 persons live within a three mile radius. Family incomes vary widely, but in 1970 Richmond median family income was just below the SMSA median.

Walnut Creek: The Walnut Creek station, with daily patronage of 3,700, is an aerial structure at the northwest edge of the central business district near the I-680 freeway. The immediate vicinity is an older, loosely built residential area, with auto-oriented retailing on the major thoroughfares. Perhaps the most notable example of BART-induced development at any station is the 10-story Walnut Creek Plaza office building across the street. Large apartment complexes have been built just beyond walking distance where land was available, but land assembly problems and high asking prices for existing older homes have resulted in little new residential construction closer to BART.

Walnut Creek's population (including annexed territory) increased at an average annual rate of 15 percent between 1960 and 1970, slowing to 3 percent in the 1970-1977 period. Minority representation is very low. Median family income and median housing value were about 40 percent above the SMSA average in 1970. Multi-family units comprise 60 percent of the city's housing stock, compared with 20 percent for all Contra Costa County.

Hayward: Until the 1950s, Hayward marked the southern limit of urban development in Alameda County and was the service center for the agricultural areas further south. Since 1970, land shortage has slowed the city's growth. The current population of 96,900 (1977) occupied housing built mainly during the 1950s (50 percent of the stock) and later (35 percent). In 1970, Hayward's median income was 12 percent above the SMSA median, but median housing value was below that of the SMSA. There were equal numbers of owners and renters, a split similar to the SMSA as a whole. The Hayward station (3,400 riders daily) adjoins the older edge of downtown, away from the direction of retail growth. Mixed industrial, commercial, and older housing are within walking distance. The South Hayward station (1,900 riders daily) has pre-BART subdivisions nearby; a large mobile home park and some apartments have been built within the last 10 years, but vacant land remains within walking distance.

Fremont-Union City: The two most southerly cities on the Fremont line include much of the vacant developable land close to BART. Both are served by aerial stations and have much vacant land and little housing within walking distance. Union City station (3,400 daily riders) has a small shopping center adjoining, and the Fremont station (3,500 daily riders) is at the edge of the city's designated central business district, which contains several partially developed shopping centers and major department stores.

Union City has grown from 6,000 in 1960 to 33,000 in 1977, and Fremont, with by far the largest territory of any BART area city, grew from 44,000 in 1960 to 117,000 in 1977. Almost one-third of the 12,000 residential units built in Fremont between 1970 and 1975 were in multi-family structures, while Union City's share of multi-family units increased from 15 percent to 25 percent during the same period. In 1970, family incomes were higher than SMSA median, while housing values were 10 percent lower. Blacks comprised 0.4 percent of the population, and the Spanish language and Spanish surname population was 20 percent.

Pittsburg-Antioch: Pittsburg, 10 miles east of the BART terminus in Concord, and Antioch, 3 miles further, have heavy industry along the Sacramento River as their economic base. Growth at a rate faster than the SMSA during the last decade is in part due to the availability of housing at prices lower than in Contra Costa communities closer to the metropolitan centers. Pittsburg grew from 19,000 in 1960 to 26,500 in 1977, with most of the gain after 1970. Antioch doubled to 34,700 during the same period, also with most of the growth occurring during the 1970s. Median family incomes are about 16 percent above the 1970 SMSA median, while housing values are 25 percent lower. Black population is concentrated in the unincorporated community of West Pittsburg. The original BART plan proposed rail transit service to these communities, and in 1976 a feasibility study for extension of BART from Concord to Antioch was prepared.

Testing Procedures

The Work Element 5 research hypotheses were analyzed using two complementary methods. First, quantitative methods -- time series analyses of building permit

records, journey to work census data, bank loans for residential rehabilitation, aerial photographs of development activity, and 1976 BART Passenger Profile Survey data -- were employed to identify baseline conditions and current trends in the Bay Area housing industry. Second, key informant interviews, both formal questionnaires and open-ended discussion, were conducted to confirm and explain the findings of the quantitative analysis. Persons interviewed included developers, local public officials, building inspectors, planners, apartment managers, and others closely associated with the housing industry.

Quantitative Methods

Analyses of building permits were most applicable to testing Hypotheses 1, 2, and 5. For Hypotheses 1 and 2 the number of residential units authorized in each of the nine study areas was tabulated for the years 1962 through 1977. Each community's annual permits were divided by the total number of housing units authorized in Alameda, Contra Costa, and San Mateo Counties, excluding Oakland, to establish the community's share of suburban residential development. The resulting percentage for each community then was compared to shares for the other communities and a time series analysis was conducted, considering pre-BART, BART construction, and post-BART periods separately. After accounting for land availability, price, development constraints, and community image, a statistically significant departure from baseline trends was interpreted as evidence of BART's impact on the housing industry. A one-tail t-test was used to compare the mean shares for each time period. Only differences established at the 95 per cent confidence level or better were accepted as statistically significant.

For Hypothesis 5, analyses of annual residential building permits were conducted in two ways. First, annual permits within walking distance of each study area's BART station(s) were categorized by type of structure. If a greater share of high density residential construction (e.g., apartment or condominium projects) were built coincidental with the initiation of BART service, as opposed to continuance of low density construction (e.g., single family detached houses), then arguably BART will have had an impact on station area densities. Second, annual permits for high density residential projects within walking distance of the BART station were divided by the total number of such permits issued in the given study area as a whole. If BART were having an impact on densities in a station area, the station area's share of total high density construction should increase with the advent of BART.

Analysis of bank loans for residential rehabilitation was most relevant to Hypotheses 3 and 4. Bank disclosure statements for 1975 and 1976 (available to the public pursuant to the federal Home Mortgage Disclosure Act of 1975) were requested from Bay Area lending institutions. Among the disclosure statements received, the institutions with significant home improvement loan portfolios in the five test areas were Wells Fargo Bank, Crocker National Bank, and Bank of America. From these sources, the total number and amount of home improvement loans made in each of the study area census tracts in 1975 and 1976 were tabulated. Though not all rehabilitation loans could be identified this way, and though

privately financed renovation activities (often without a loan or a building permit) do not appear, the number of the identified home improvement loans can be considered representative of the relative amount of rehabilitation occurring in the different census tracts in a given station area.

Once the number and value of home improvement loans in all census tracts had been tabulated, a set of rehabilitation activity indices were generated. The need for alternative indices stems from the insufficiency of any one index. For example, the total number of home improvement loans issued could be taken as a singular measure of rehabilitation activity, but such a measure would imply that 20 loans for $3,000 each are more significant than 15 loans for $8,000 each — even though the latter example encompasses $120,000 in loans while the first case represents only $60,000. Conversely, if total funds loaned becomes the singular measure of activity, a small number of high cost projects would present a misleading picture of neighborhood upgrading.

Seven indices were developed to measure rehabilitation activity in the study area census tracts: (1) Total number of home improvement loans; (2) total amount of all such loans; (3) average loan size; (4) total number of loans divided by all housing units; (5) total number of loans divided by all housing units built before 1939; (6) total amount of loans divided by all housing units; (7) total amount of loans divided by all housing units built before 1939. The last four indices attempt to normalize the earlier indices according to the number of candidate dwellings in any given census tract (i.e., units built before 1939).

Each study area census tract was rated according to each of the seven indices as having a high, medium, or low amount of rehabilitation activity. The seven ratings given each census tract were then compared. In most instances, the seven ratings were in agreement as to whether a census tract should be classified as a high, medium, or low rehabilitation activity area. If a given census tract had conflicting ratings, a composite rating was judgmentally assigned.

Once each study area census tract had been rated as a high, medium, or low rehabilitation activity area, an attempt was made to control for socio-economic and environmental differences between tracts. Within each study area, similar census tracts were identified using 1970 census characteristics. The variables examined were: population density, percent of population under 18 years of age, percent over 65 years of age, percent black, median family income, percent employed in blue collar occupations, median contract rent, and percent of the housing stock built between 1960 and 1970. Differences in rehabilitation activity in otherwise similar tracts were particularly noteworthy for Hypotheses 3 and 5.

The next type of quantitative analysis, examination of pre- and post-BART aerial photographs, mainly was applicable to Hypotheses 5 and 6. To test Hypothesis 5, aerial photographs of BART station areas taken in 1965, 1975, and 1977 were compared to identify residential construction within walking distance of study area BART stations. Where new residential projects were evident, the density was determined.

For Hypothesis 6, all areas experiencing BART-related noise at levels exceeding the surrounding community average were identified using the findings of the Environment Project.[4] Nowhere does BART-related noise exceed the community average at distances greater than 250 feet from BART trackage. Though perceived noise levels at times may be more important than actual noise levels, the 250 foot limit on noise impacts was appropriate for delineating the outermost boundary of noise impacted properties. Comparison of 1965 and 1977 aerial photographs showed development activity. If Hypothesis 6 were valid, significantly fewer residential units would have been constructed on available parcels in noise impacted areas than on comparable parcels in non-impacted areas.

The final type of quantitative analysis, focusing on 1976 BART Passenger Profile Survey results, is most relevant to Hypotheses 1 and 2. People reporting that they only began to commute by BART after moving to an outlying community may represent the maximum number of BART-induced households, and, thus, the upper limit of BART's impact on new residential construction in these areas. The approach assumes that: (1) the areas where BART has provided the greatest improvement in transit service are equivalent to the areas perceived as beyond commute distance by most potential buyers; (2) commute trips are the only types of BART trips that significantly influence household locational decisions in outlying areas; (3) all commute trips are made by persons who would not live in the given outlying communities were BART not available (Hypothesis 2 includes the phrase "previously perceived as beyond commute distance"); and (4) the number of (BART) commuters living in residential units that are not new are offset by the number of non-commuters living in new residential units.

The 1976 BART Passenger Profile Survey data of greatest significance to the above model were derived from survey questions addressing trip purpose, trip origin and destination, socio-economic characteristics of the respondents, whether the trip would be made were BART not available, and whether the trip was ever made before the respondent began using BART. The statistical frequency distribution of survey responses was used to determine the number of respondents fitting the model's criteria. This number then was taken into consideration with the total sample size, sampling rate, missing data percentage, and average BART commuters per household to arrive at an estimate of the number of households whose housing opportunities were affected by BART.

Key Informant Interviews — Though exploratory key informant interviews were conducted early in the project, the main focus of most of the Work Element 5 interviews was to confirm, refute, or interpret the results of the quantitative analyses. Some observations could be made only from interviews, but in most instances quantitative analyses and key informant interviews were complementary.

4. Bolt, Beranek & Newman, Inc., Acoustical Impacts of BART - Interim Service Findings (Springfield, Virginia: National Technical Information Service, March, 1976).

Both formal and informal interviews were conducted. Informal interviews had no pre-specified format, but typically were telephone conversations seeking the informant's reactions to a set of recent observations, or to obtain additional insights and information for in-depth analyses. Formal interviews, by contrast, relied on a previously prepared questionnaire. Though formal interviews entailed a certain degree of probing and tangential questioning, for the most part specific answers were sought to specific questions. Formal interviews thus were better suited for summarizing and cross-indexing of responses. The names and affiliations of key informants interviewed for Work Element 5 (except for those informants wishing to remain anonymous) are listed in Appendix A; the interview questionnaires are contained in Appendices B, C and D.

Twenty-six residential developers active in the BART service area were interviewed. These developers did not constitute a random sample, but were selected as a representative panel. Selection criteria required representation of large volume as well as small volume developers, national as well as local firms, single family as well as multi-family developers, builders specializing in residential rehabilitation as well as those specializing in new construction, and developers active in central Bay Area cities as well as those active in rapidly growing, outlying communities. All told, the interviewed developers have constructed well over 30,000 residential units since 1965.

One-third of the developers were interviewed in-person and two-thirds were interviewed by telephone during June and July 1977. In-person interviews lasted an average of 35 to 40 minutes; telephone interviews, 20 to 25 minutes. Most of the interviewees were very cooperative, though of course some developers had trouble remembering the details of decisions and events that occurred up to 15 years ago.

Questions relevant to all seven Work Element 5 hypotheses were asked. The responses of each interviewee to similar questions were cross-checked as a measure of interviewee consistency. The distribution of responses by all interviewees to each question were then reviewed, in order to identify commonly held attitudes.

While developer interviews focused primarily on the supply side of the Bay Area housing industry, the apartment manager interviews focused on the demand side. Apartment manager interviews related mainly to Hypotheses 1 and 2. A total of 12 interviews were conducted, all by telephone in July 1977. Apartment managers were selected from advertisements that mentioned proximity to BART in a Bay Area directory of rental housing and in newspaper ads. Almost all the apartment complexes were built during the last 10 years in expanding suburban communities typified by Hypotheses 1 and 2. As with the developer interviews, responses first were checked for internal consistency and then reviewed for attitudes common to most of the respondents.

Twelve additional apartment manager interviews were conducted in central city study areas (the Mission District, Richmond, and Fruitvale) to provide possible insights for Hypotheses 3 and 4. The results proved not to be helpful for Work Element 5 because few buildings were built or rehabilitated within the past

10 years and because few tenants ride BART. However, the interviews may prove useful in the upcoming LU&UD Project's study of property values and rents (Work Element 13) and the study of development patterns (Work Element 7).

To complement the quantitative analysis of home improvement loans and to gain an historical perspective on station area rehabilitation, eight interviews were conducted with building inspectors and knowledgeable planners in Daly City, Hayward, Oakland, Richmond, San Francisco, and Walnut Creek. A questionnaire was designed to elicit information on rehabilitation trends over the past 15 years in the BART station areas in contrast to other, similar neighborhoods in the community and to relate any changes to BART construction or the opening of service (see Appendix D). If differences were noted, the informants were asked to identify specific projects that might have been attributable to BART. Had these interviews indicated major changes potentially attributable to BART, (which they did not, as the presentation of findings in the following chapter will show), then a quantitative time series analysis of building permits for alterations and additions would have been conducted to gauge the magnitude and extent of BART's impact on rehabilitation activity.

LIMITATIONS

Four types of limitations affect Work Element 5. The first concerns data availability. Obviously, not all quantitative data that are desirable are readily available. Some types of data simply do not exist in given jurisdictions, or may exist but still not be in readily usable form. The weight given to BART proximity by home developers in the 1960s and the amount of residential rehabilitation are examples. In a different vein, too much data can prove overwhelming; more than 600,000 dwelling units were authorized for construction in the nine-county Bay Area between 1964 and 1976, necessitating careful consideration of precisely the types of data to be gathered. Key informant interviews are only as good as the perceptions and memories of the interviewees. Finally, for both quantitative analyses and key informant interviews, potential violations of confidentiality impose restrictions on data use.

The second type of limitation concerns overlaps between Work Element 5 analyses and those of other work elements. Despite the fact that some overlap between work elements is inevitable, the scope of each work element nevertheless is well defined. Questions that arose during the course of Work Element 5 analyses sometimes were bypassed because of pending research in later work elements. An example is the relationship between Work Element 5 and Work Element 3, Study of Households' Locational Decisions. The salient factors in household locational decisions bear directly on housing demand, such that one might expect an exploration of such factors during Work Element 5 analyses of the BART's effects on the housing industry. Ultimately, the findings of Work Elements 3 and 5 will be correlated and synthesized in the LU&UD Project final report. Consequently, this paper does not directly consider BART's effects on households' locational decisions. Similar limitations are imposed by the Study of Property

Values and Rents (Work Element 13), the Study of Property Acquisition and Occupancy (Work Element 14), and the assimilative Study of Development Patterns (Work Element 7).

Third is the recent change in the housing market caused by rapid escalation in new home prices over the past 12-18 months, due to increased household formation rates and housing demand, a "buy now before it's too late" attitude, water and sewer hookup moratoria, and a certain amount of speculative activity. These factors have affected supply and demand far more than BART could have, an overshadowing which makes the task of isolating BART's impact from these and other influences much more difficult. Coincidentally, during this same period BART has been settling into a pattern of full service and increasing train reliability, thus creating what would have been optimum conditions for identifying and measuring BART's land use and urban development impacts. It now appears that many of BART's effects on the housing industry may still be years away, and only quantifiable after a new equilibrium is established in the real estate market.

Finally, the nine study areas selected for Work Element 5 may or may not encompass the sites of BART's most substantial residential impacts. Additional insights on BART's impacts on station vicinities will be forthcoming in the study of development patterns (Work Element 7) and the study of station area land use (Work Element 15).

3. FINDINGS

The seven Work Element 5 hypotheses all are interrelated, but several of the hypotheses are particularly well suited for joint investigation. Hypotheses 1 and 2, for example, both focus on BART's impacts on residential construction in outlying communities where access to downtown San Francisco and Oakland has been significantly improved. Hypotheses 3 and 4 address rehabilitation activity in declining neighborhoods adjoining BART stations. Accordingly, the following presentation of Work Element 5 findings is organized on a geographic basis considering BART's effects on the housing industry in:

- Outlying Communities (Hypotheses 1 and 2)
- BART Station Areas (Hypotheses 3, 4, and 5)
- BART Service Corridors (Hypotheses 6 and 7)

Within each impact area, the relevant hypotheses will be interpreted, the principal study areas will be identified, and the conclusions will be presented.

IMPACTS ON OUTLYING COMMUNITIES

HYPOTHESIS 1. BART has added impetus to construction of new housing in areas where it provides greatest improvement in transit accessibility to downtown San Francisco and Oakland.

HYPOTHESIS 2. BART has induced single family residential development beyond outlying stations in areas previously perceived as beyond commute distance from downtown Oakland and San Francisco by most potential buyers.

BART has not affected new housing construction at a regional scale, but it has influenced residential development in two corridors along the Concord line and the Fremont line and in the outlying communities of Pittsburg and Antioch. To arrive at this conclusion involved analysis of accessibility changes, building permit trends, passenger profile data, and key informant interviews.

Both hypotheses focus on communities for which access to downtown San Francisco and Oakland has been improved the most. Hypothesis 1 addresses all housing construction induced by all types of trips, whereas Hypothesis 2 concentrates on single family residential construction induced by work trips. Thus, Hypothesis 2 findings constitute a subset of Hypothesis 1 findings.

Hypotheses 1 and 2 are more difficult to confirm or deny than any of the other Work Element 5 hypotheses. As will be demonstrated in a moment, the study areas relevant to the hypotheses lie at the periphery of urban expansion in the BART service area. BART's influence on growth in these outlying areas must be isolated from all other factors affecting growth -- including, for example,

the absence of developable land closer to the center, the relatively lower prices of new units at the periphery, and the strong demand for single family homes in specific neighborhoods and communities. Because of this complexity, a clearer perspective on BART's impacts in outlying communities probably will have to wait until the results of Work Element 5 can be integrated with those of the study of households' locational decisions (Work Element 3) and, to a lesser extent, the study of development patterns (Work Element 7) in the project final report.

In order to identify Work Element 5 study areas relevant to Hypotheses 1 and 2, BART travel times were compared with No-BART Alternative (NBA) travel times in each service corridor to gauge BART's effect on accessibility from the nine Work Element 5 study areas to downtown San Francisco and Oakland. Those study areas exhibiting the greatest increase in accessibility due to BART (i.e., the greatest difference between BART and NBA travel times) are the subjects of housing industry analyses.

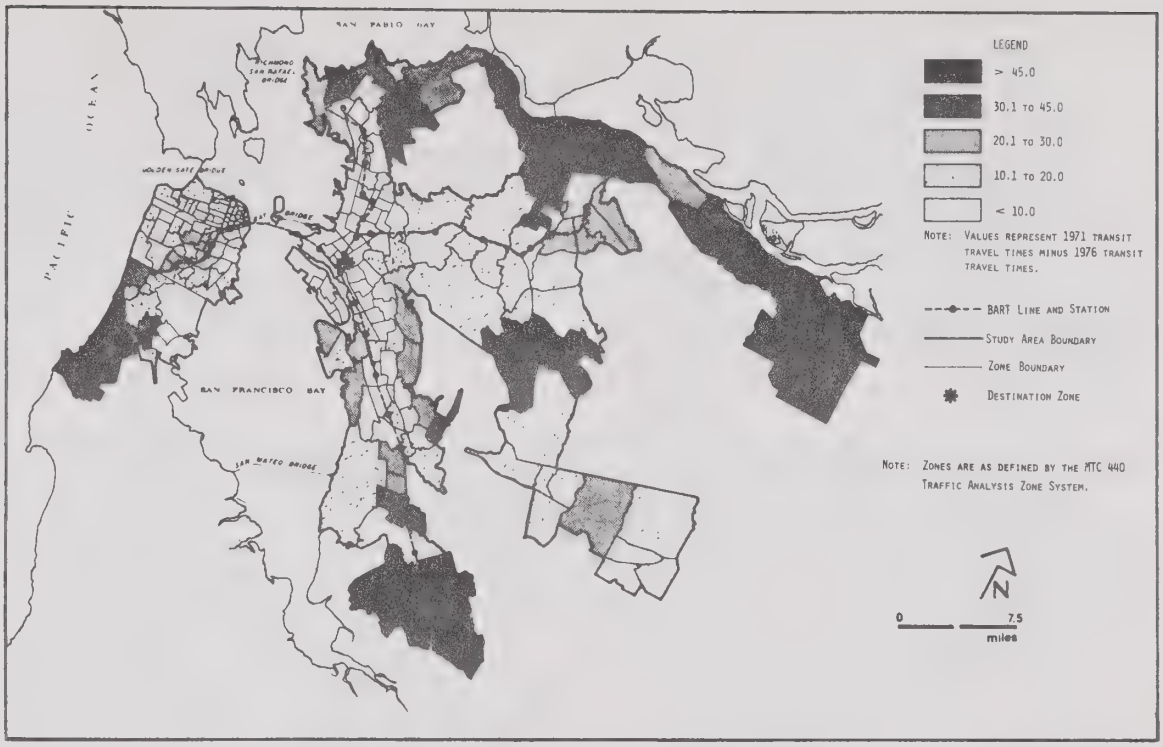
The accessibility mapping effort (Work Element 2) as well as the TSTB Project's findings[5] have measured both absolute differences and percentage differences in BART-NBA travel times. Figure 2 depicts the findings of these analyses. Not surprisingly, the Work Element 5 study areas that show the greatest improvement in transit accessibility to downtown San Francisco and Oakland are Hayward, Union City-Fremont, Walnut Creek, Pittsburg-Antioch, and Daly City-Pacifica. There, the average travel time improvement was 22-39 minutes (17-24 percent) versus 10 minutes (14 percent) for the BART service area as a whole.

Only in Fremont-Union City and Pittsburg-Antioch did the annual share of suburban residential construction (number of units authorized) in Alameda, Contra Costa, and San Mateo counties, excluding Oakland, show a statistically significant increase over the period 1962 to 1977. In the Fremont-Union City study area the proportion of suburban housing authorized in the three counties rose from an annual average of 7.5 percent (1962-66) to 14.3 percent (1967-72) and 11.7 percent (1973-77). In Pittsburg-Antioch the increase was more dramatic, with the share of suburban housing constructed in that market area increasing almost fourfold from an annual average of 2.4 percent (1962-66) to 4.8 percent (1967-72) and to 8.6 percent (1973-77). In each of the other suburban communities studied the overall trend has been downward. Table 2 shows the trend computed for each community, treating construction of single family housing and multi-family housing separately; Appendix E presents the statistics, number of units authorized and share of total, upon which this analysis was based. While the data in Appendix E shows occasional dramatic shifts in projections for given areas, some of the variation can be explained by one large project being approved.

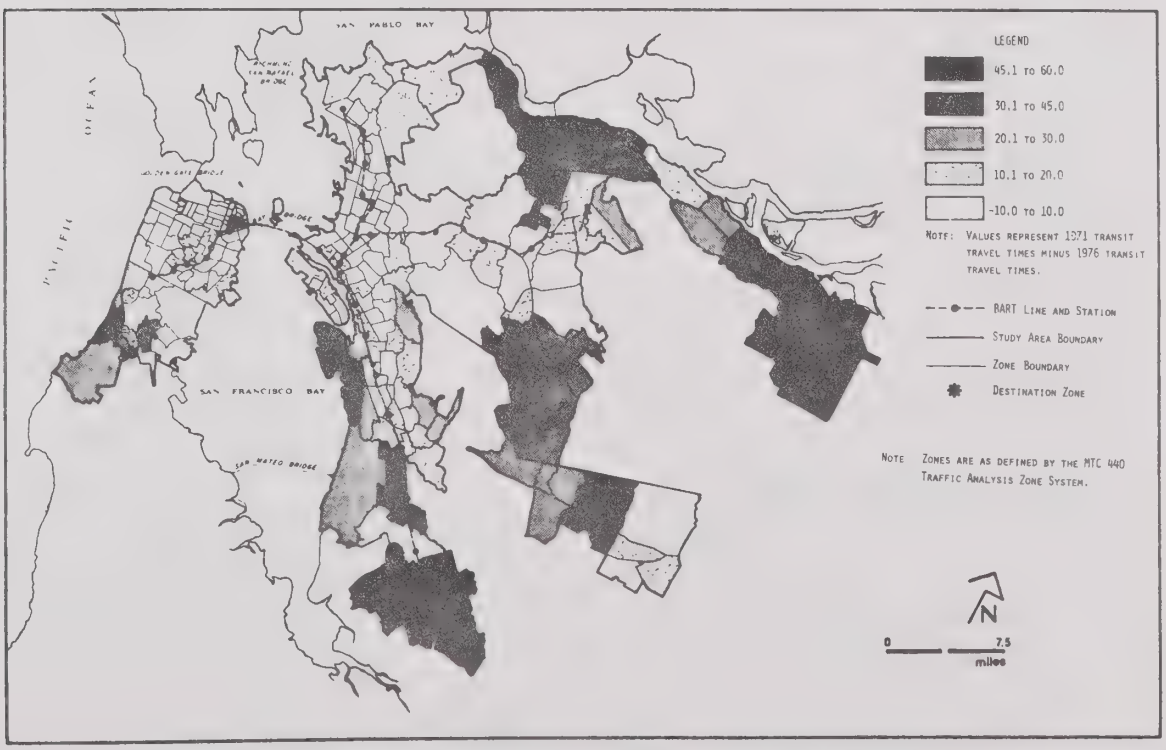
BART may be only one of a number of factors affecting a community's share of housing construction in the region. Land availability, environmental regulations, and community image all may affect local construction trends. As

5. Peat, Marwick, Mitchell & Co., Analysis of BART's Accessibility Impacts (San Francisco, California: BART Impact Program, December, 1976).

FIGURE 2.



CHANGES IN PEAK PERIOD ACCESSIBILITY TO OAKLAND CBD



CHANGES IN PEAK PERIOD ACCESSIBILITY TO SAN FRANCISCO CBD

(CHANGES IN PEAK PERIOD ZONE-TO-ZONE TRAVEL TIMES, 1976 (POST-BART) TRANSIT SYSTEM COMPARED TO 1971 (PRE-BART) TRANSIT SYSTEM)

Source: • Peat, Marwick, Mitchell & Co. Analysis of Regional Transit Network Travel Time Matrices.

TABLE 2. TRENDS IN THE DISTRIBUTION OF RESIDENTIAL CONSTRUCTION IN SELECTED SUBURBAN AREAS, 1962-77

Percent Share of Permits Authorized in Alameda, Contra Costa, and San Mateo Counties (excluding Oakland)

	Single Family	Multi-Family	Total
Daly City-Pacifica			
1962-66	6.5	5.9	6.2
1967-72	6.7	3.6	5.4
1973-77	3.6	8.6	4.9
Average Annual Change	-0.2	0.2	-0.1
Fremont-Union City			
1962-66	12.0	3.0	7.5
1967-72	17.5	11.7*	14.3*
1973-77	13.2	9.0*	11.7*
Average Annual Change	0.1	0.6	0.4
Hayward			
1962-66	1.4	6.8	4.1
1967-72	1.9	4.5	2.9
1973-77	2.2	5.9	3.2
Average Annual Change	0.1	-0.2	-0.1
Pittsburg/Antioch			
1962-66	2.7	2.0	2.4
1967-72	6.6*	2.7	4.8*
1973-77	9.6*	5.0	8.6*
Average Annual Change	0.7	0.4	0.6
Walnut Creek			
1962-66	4.1	8.3	6.2
1967-72	4.2	9.0	6.5
1973-77	3.7	8.4	4.9
Average Annual Change	-0.03	-0.03	-0.1
Balance San Mateo County			
1962-66	16.6	31.9	23.7
1967-72	12.8	24.7	18.6
1973-77	15.3	28.2	18.8
Average Annual Change	-0.2	-0.2	-0.4

*Significant increase over 1962-66 period at the 95 percent confidence level based on a one-tail t-test.

Source: JBA, Security Pacific Bank Construction Reports

less land is available for development, a community's share of regional construction understandably should decline. This explains the long-term trends in Daly City, Hayward, and Walnut Creek. However, in Fremont-Union City, Pacifica, and Pittsburg-Antioch much of the buildable land remains undeveloped according to ABAG's 1976 Vacant Land Survey (see Table 1). Can the differences in these communities be explained by growth attributable to BART, or were they simply in the path of urban expansion so that an increasing share of residential development was inevitable with or without BART? To answer this, first BART's potential impact on housing demand was analyzed, and then developers were interviewed to determine their perceptions of BART's effects on investment decisions and construction trends.

BART's 1976 Passenger Profile Survey indicates that about 2,500 persons are using BART for work trips who did not make the same trip before the beginning of BART service. Because many of these people formerly may have lived or worked outside the BART service area, it may be inferred that less than 2,500 persons specifically have changed residence or job location since service began in order to ride BART to work. While this figure may be taken as an upper limit of direct BART impact on residential moving and location decisions, it does not account for decisions by developers to proceed that may have been based in part on better access with BART. Nor does it account for householders' decisions to buy or rent based on the availability of housing at BART-served locations, or the notion that they might want to use BART. Retired householders or those looking toward retirement may have found the potential freedom from dependence on the automobile attractive.

Apartment Managers' and Developers' Interviews

Further evidence of BART's effects on the housing industry was provided by the apartment managers and developers interviews. Managers of recently constructed apartments advertising proximity to BART indicated:

- BART was mentioned "often" or "occasionally" as opposed to "rarely" by those inquiring about rentals.

- Approximately 10-20 percent of the tenants ride BART, although a few developments (e.g., a Daly City project (confidential) and Greenwood Apartments, Walnut Creek) have higher ridership rates.

- BART influenced the decision to build two apartment complexes in Walnut Creek (Diablo Keys and Stoneridge — see Table 3).

- BART contributed to the success of 6 out of 11 projects, but only one manager (Bettencourt) thought that improved BART service would affect future rentals.

The developers confirmed that while BART has not been a paramount factor in the growth of the study areas, it has influenced demand, and a number of projects may be attributed at least in part to BART. Their most pertinent observations are:

- Market demand and land availability are by far the two most important factors in development decisions; proximity to transportation and BART in particular are judged less critical.

- BART affected location decisons at least on 6 major projects representing 3,500 units — 10 to 15 percent of the 1965-77 volume of housing built in the BART corridor by those interviewed (see Table 3). Impacts on project densities, price range, and timing were less frequently mentioned. (Further interviews may raise the number of BART-induced projects somewhat, but with most major developers interviewed, overlooked projects are likely to be small.)

- BART boosted sales according to a majority of those interviewed -- 5 buildings in Pittsburg and Antioch, 5 in Fremont, 3 in Walnut Creek, and 1 in Daly City.

- BART has increased the absolute level of housing demand in Pittsburg-Antioch, has probably increased the level of demand in Union City-Fremont, but has not affected demand in Daly City-Pacifica. Impacts in Hayward and Walnut Creek remain unclear.

Correlating these findings with the building permit analysis suggests that BART, at least in the Fremont-Union City and Pittsburg-Antioch housing markets, has caused a net increase in the amount of new housing over what would have been built in the absence of BART, but central Contra Costa County and Daly City-Pacifica housing construction volumes have not been measurably affected. In terms of housing types BART has affected decisions on both single family and multi-family projects, as Table 3 clearly illustrates. In sum, BART has been a contributing factor in Bay Area suburbanization, affecting both supply and demand to varying degrees. However, at a regional scale, BART should be viewed as a relatively unimportant factor in the housing industry at large, mainly affecting timing and location decisions. Further measures of BART's impacts on residential development trends will be provided by the studies of households' location decisions and development patterns.

IMPACTS ON BART STATION AREAS

HYPOTHESIS 3. BART has induced residential rehabilitation and redevelopment in older residential neighborhoods adjacent to stations.

HYPOTHESIS 4. In minority neighborhoods adjoining BART, BART has created less impetus for rehabilitation or additions to the housing supply than in white neighborhoods with similar development potential adjoining BART stations.

Little substantive evidence was obtained either from analysis of home improvement loans or key informant interviews that BART has measurably affected rehabilitation activity in neighborhoods adjoining BART stations. Differences

TABLE 3. RESIDENTIAL PROJECTS SIGNIFICANTLY INFLUENCED BY BART

Project	Location	Type	Number of Units	When Constructed	Nature of BART Impact
Diablo Keys	Walnut Creek	Apartments, all types $255-$600/month	788	1970-72	Deliberately located near BART, and timed to coincide with BART opening.
Bancroft Village	Walnut Creek	Townhouses, $77,000-$87,000	400	1976-79	Timing advanced one year.
Ranchos Medanos	Pittsburg	Single family detached, $44,000-$57,000	900	1976-80	Location, timing, and density affected.
Stoneridge	Walnut Creek	Apartments, 1 and 2 bedroom, $240-$335/month	339	1970	Initial location and subsequent demand attributable to BART, at least in part.
Anonymous	Fremont BART line	Luxury apartments	300-400	1978+	Location and character heavily dependent on BART.
The Hub	Fremont	Condominiums, $60,000-80,000	712	1978+	Location and density geared to a BART market

Source: John Blayney Associates

between activity in minority and non-minority neighborhoods could not be tested in the study areas because all neighborhoods that both adjoin BART stations and are candidates for significant rehabilitation activity also are at least one-third minority. Thus, opportunities for comparisons between minority and non-minority neighborhoods were not available.

Home Improvement Loan Analysis

Using 1975-76 bank disclosure statements of home improvement loan activity as a reasonable gauge of bank-financed rehabilitation within census tracts, BART has not had a major impact around the Fruitvale, Mission District, and Richmond stations. Figure 3 summarizes the results of this analysis; Table 4 presents the average volume of loans in each classification category.

TABLE 4. HOME IMPROVEMENT LOAN ACTIVITY BY STUDY AREA, 1975-76

(Average Amount per Tract in Thousands of Dollars)

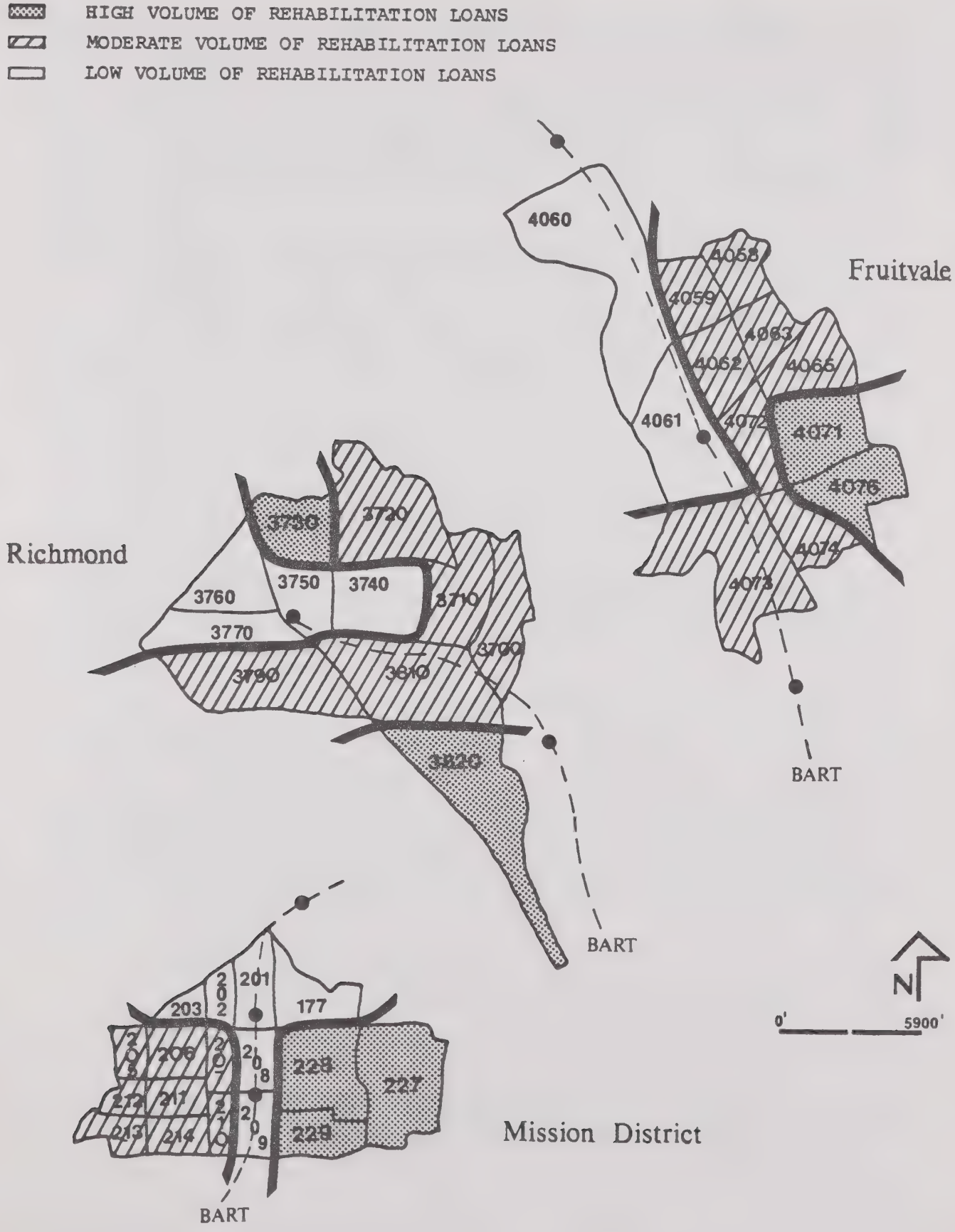
	High Volume	Moderate Volume	Low Volume
Fruitvale	49.0	16.0	2.00
Mission District	77.6	36.6	6.00
Richmond	87.5	41.0	9.25

In census tracts that are not in immediate proximity to BART stations, bank financed rehabilitation activity is greater than in neighborhoods that are adjacent to the stations -- a pattern clearly evident in all three study areas. Numerically, census tracts containing BART stations average 2.4 loans from federally regulated institutions per year at $2,600 per loan; non-BART station tracts averaged 6.8 loans per year at $4,500 per loan, or about three times BART station area averages. Among the remaining test areas, four were dropped from this phase of analysis.

Daly City, Hayward, East Oakland, and Walnut Creek BART station vicinities either lacked a significant amount of bank loan activity, had census tract boundaries that precluded comparisons between properties near a BART station and properties further away, or were dominated by non-residential land uses near BART. Consequently, these areas were excluded from the home improvement loan analysis, but areas were covered in the key informant interviewing with building inspectors.

Has BART created disincentives to rehabilitation, or were other factors more important than BART in rehabilitation decisions? One argument in support of the former contention is that property owners close to BART have adopted

FIGURE 3. SUMMARY OF RESIDENTIAL REHABILITATION ACTIVITY IN FRUITVALE, RICHMOND, AND THE MISSION DISTRICT BY CENSUS TRACT -- 1975 AND 1976



SOURCE: JOHN BLAYNEY ASSOCIATES, BASED ON BANK DISCLOSURE STATEMENTS FOR 1975 AND 1976, AND U.S. CENSUS DATA FOR 1970

a "wait and see" attitude, and are avoiding property investment actions for awhile. Additional rehabilitation disincentives attributable to BART may include noise and other adverse environmental impacts (as will be explored under Hypothesis 4 later in this working paper). Though such disincentives may be relevant in a limited number of instances, the preponderance of evidence suggests that rehabilitation activity has not been significantly affected by BART-related disincentives. Rather, other factors described for each station area in the following paragraphs are more important than BART in rehabilitation decisions.

Mission District — Differences between rehabilitation activity in station area census tracts and rehabilitation activity in non-station area census tracts in the Mission District are at least partially explainable by differences in land use. BART underlies Mission Street, the main commercial spine of the Mission District. The physical character of the street, its pedestrian and vehicular traffic levels, its commercially oriented property costs — all discourage housing investment.

The best publicized rehabilitation activity in the Mission District has focused on Noe Valley and Castro Street, located one mile west of the BART stations. Relatively affluent households unable to obtain suitable housing in more expensive areas of San Francisco have been displacing lower income groups that formerly occupied these neighborhoods. As higher income enclaves have formed, ever greater numbers of affluent households have moved in and rehabilitated Victorian structures. Since Noe Valley and Castro Street are not adjacent to BART and accessibility gains are small, the above trends cannot be termed BART-related -- an interpretation confirmed by the key informant interviews.

Additional factors appear more important than proximity to BART for explaining rehabilitation trends in the Mission District:

Station area census tracts have a smaller percentage of single family homes than non-station area census tracts — 7 percent versus 16 percent to the east and 31 percent to the west.[6] Rehabilitation is more attractive to owner occupants than to apartment investors who would be unlikely to realize an attractive return on a higher investment unless the neighborhood character were to change so drastically that different tenants could be attracted at much higher rents. This occurred on Telegraph Hill in the 1950s and is happening in "south" Pacific Heights now, but is unlikely to occur as a result of BART service.

Public transportation provided by the San Francisco Municipal Railway (Muni) serves most of the Mission District as well or better than BART for most work trips by present residents.

Vacancy rates are higher in station area census tracts than in non-station area

6. U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population and Housing - San Francisco-Oakland SMSA (Washington, D.C.: U.S. Government Printing Office, 1972).

census tracts, suggesting that the most desirable places to live (and hence the primary places for seeking a dwelling to rehabilitate) are not in immediate proximity to BART.[7]

In the same vein, rents are lower, incomes are lower, and minority representation is higher in station area tracts than in non-station area tracts.[8]

Richmond — The 107-acre redevelopment area west of the Richmond station has a few new buildings but is mainly vacant. Only one 173-unit multi-family residential project has been built in recent years and it reportedly was not induced by BART [9] (Evans, Berndt). Significant rehabilitation work has not occurred on existing residential structures in the redevelopment area.

To the east of the BART station are fairly stable residential neighborhoods built in the 1940s and 1950s. BART's major impact near the station was the removal of some residential units for station parking. In the census tract encompassing the Richmond BART station, only three rehabilitation loans were issued in 1975-1976, according to the bank disclosure statements. Neither BART nor any other significant force can be said to have created impetus for rehabilitation in this area (Marziano, Bates).

Fruitvale — The Fruitvale BART station is in a predominantly commercial and industrial area. Though a few residential units can be found to the west of the station, almost all residential neighborhoods are east of the station across East 14th Street. Given that East 14th Street is a major arterial and strip commercial corridor in southeastern Oakland, and given the deteriorated nature of the other areas separating the BART station from the residential neighborhoods, residential rehabilitation opportunities are limited in the Fruitvale BART station vicinity.

Even were rehabilitation opportunities more numerous and contiguous, a link between rehabilitation activity and the presence of BART would not be evident. The reasons are threefold:

First, little rehabilitation activity has been occurring anywhere in the Fruitvale area (Blyler). The industrial and commercial character of the area, an influx of minorities into the area, extensive maintenance needs of the housing stock — all have contributed to the decline of Fruitvale. Fruitvale has become characterized as an undesirable locale for business investments and real estate improvements.

7. San Francisco Department of City Planning, Residences: 1973 Vacancy Survey (October, 1973).
8. 1970 Census of Population and Housing, op. cit.
9. Key informant interviews conducted by Human Resources Corporation under contract to John Blayney Associates, July, 1977.

Second, to the extent that rehabilitation activity is occurring, such activity is focusing on areas furthest away from the BART station. The remodeling of multi-family units and the expansion of single family units into multi-family units, all on a limited scale, has been taking place in order to satisfy market demand for cheaper units. Such demand stems from the continuing influx of low income groups into Fruitvale, rather than the presence of BART.

Third, little rehabilitation activity is likely to occur until federal and state housing programs are adequately funded and administered. The analysis of Hypotheses 3 and 4 focused on BART's effects on private rehabilitation decisions; the Program-Wide Case Studies (Work Element 16) will consider public programs — e.g., the Rehabilitation Assistance Program (RAP) active in San Francisco.

Building Inspectors and Planners Interviews

According to key informants, the trends of major housing rehabilitation in neighborhoods adjacent to BART stations generally did not support the hypothesis of increased rehabilitation activity attributable to BART. The only study area that showed a notable increase in rehabilitation activity during the study period was in the Mission District, but not immediately adjacent to the BART station, confirming the home improvement loan analysis. Rehabilitation here has been of a cosmetic nature, not involving major structural renovation or alteration. The San Francisco Housing inspector who was interviewed (Devlin) stated that BART, along with other factors, did have a positive impact on the increase in housing investment and rehabilitation east and west of the BART stations, but not close to the station.

Building inspectors and other key informants (See Appendix A) reported no change in housing rehabilitation levels over the past 10 years in the remaining study areas adjacent to the Oakland Coliseum, Fruitvale, Hayward, Richmond, Daly City, and Walnut Creek BART stations that could be attributable to BART. BART may have decreased rehabilitation activity around the Walnut Creek and Coliseum stations by encouraging holding resulting from expectations of increased land value (Goldstrum, Blyler, and Foley).[10]

Locational differences in rehabilitation activity adjacent to the BART station study areas were not significant except for the Mission area where most of the residential rehabilitation has occurred around Dolores Park and upper Mission Street by 18th, 19th, and 20th Streets (Devlin and Soto).

Deterioration of housing in neighborhoods adjacent to the Walnut Creek station has occurred at differing rates, with the residential area to the north of the station being subject to the most rapid deterioration (Goldstrum). The Oakland

10. For details on speculation, see John Blayney Associates/David M. Dornbusch, Study of Property Acquisition and Occupancy (Berkeley: BART Impact Program Land Use and Urban Development Project Working Paper, April, 1978).

Coliseum and Fruitvale station areas currently have levels of rehabilitation similar to that of the East Oakland area. During the 1960s housing abandonment and significant deterioration was a problem in the BART station area, but this now has been reversed as owners and investors have become more concerned about conserving the existing stock (Blyler).

Speculative investment in land or housing in neighborhoods adjacent to these stations studied usually occurred during the late 1960s when there was a high level of anticipation that BART would create a strong demand for land in close proximity to the stations. Where demand did not increase significantly, which was the case for all areas except the Mission, speculation dropped off to a level where it has become a negligible factor.

In summary, analysis of home improvement loan activity and key informant interviews suggests that close proximity to BART is not viewed as a sufficient incentive for owners of older, possibly deteriorating housing to renovate their buildings in order to cater to the needs of BART riders. The isolated cases of Victorian renovation in the Mission District, which may have been BART-related according to some informants, are hardly sufficient to confirm the hypothesis. This effect was also greater not adjacent to the station, suggesting that while BART may have a positive effect on some rehabilitation decisions, increased activity generated by BART adjacent to stations may offset the positive effects in close proximity to the stations.

HYPOTHESIS 5. BART-induced construction within walking distance of BART stations is at higher densities than would have occurred without BART.

BART has not had a marked effect on station area construction, although decisions on a number of projects have been influenced by the perceived benefits of a station area location. Among the Work Element 5 study areas, only the South Hayward, Walnut Creek, and Fremont BART stations offer the opportunity to measure changes in residential densities within walking distance. Pacifica and Pittsburg-Antioch do not have BART stations, and Union City has not experienced residential development within normal walking distance. Fruitvale, Daly City, Richmond, the Mission District, East Oakland, and Hayward have experienced a few isolated instances of residential construction, none of which can be said to represent higher densities as a result of BART.[11] The absence of substantial development in Work Element 5 study areas is, of course, notable in itself; more will be said on this later.

Chapter 2 delineated the analysis methods applied to Hypothesis 5, but walking distance remains undefined. Transportation planners frequently use 1300 feet to 1500 feet as a standard acceptable walking distance to transit facilities. Careful consideration must be given to the appropriateness of relying on a

11. For details on 1965-77 station area land use changes, see John Blayney Associates/ David M. Dornbusch & Co., Station Area Land Use (Berkeley: BART Impact Program Land Use and Urban Development Project Working Paper, November, 1977).

strictly geographic measure of distance, however. Alternative methods might include travel time (how far an average person will walk in X minutes), weighted impediment indices (the distance a person is willing to walk is inversely proportional to the number of busy streets to be crossed or the average slope of the terrain), or even time and locational variables (people will not walk far at night in rundown neighborhoods). For Hypothesis 5 analyses, a suitable approach appears to be a geographic measure adjusted to reflect obvious barriers or impediments and actual average walking times for BART patrons.

For each of the BART stations in Work Element 5 study areas, it was assumed that under typical circumstances the average acceptable walking distance is 1500 feet. A loci of points 1500 feet from station entrances was drawn on aerial photographs of station vicinities. Straight line distances were used wherever pedestrians could reasonably travel; distances were measured around buildings and other obvious barriers. Once the loci of points had been generated for each study area, all potential minor and major impediments to pedestrian movement were charted, such as heavily traveled arterials. Based on the configuration of the loci of points, the number and location of impediments, and known pedestrian access times to each BART station, a final determination was made of reasonable walking distances within each station vicinity.

Since 1965, only a 187-unit mobile home park has been built in the South Hayward station area. A high density apartment complex originally was proposed in 1973 for the site, but it was dropped because of insufficient market demand and citizens complaints about adverse traffic impacts (Florence). Except for an apartment complex beyond walking distance to the northeast, all other residential development has been in place since at least 1965. Areas immediately to the north and west of the station area are occupied by single family detached homes. Another trailer park is found to the southwest at a distance of approximately one-third mile. To the east of the BART station are large, vacant parcels. A vacant parcel and the new trailer park lie south of the station.

While the new trailer park is at a higher density than the single family detached neighborhoods to the north, it is comparable to the older trailer park to the west, suggesting no departure from "baseline" densities established before BART service began. The proposed apartment complex, however, would have been built at a much higher density.

Turning to the Walnut Creek BART station vicinity, all residential building permits within a 10-15 minute walking distance (up to two-thirds of a mile) were identified. The unusually large walking radius was chosen in part because of the characteristics of Walnut Creek BART station patrons, and in part to ensure no new development projects were overlooked. Table 5 summarizes residential building permits by year and type of structure for the Walnut Creek BART station vicinity.

The table reveals that during the years 1962 to 1977 less than seven percent of the constructed residences were classified as single family detached, duplex, or triplex dwellings. All the remainder were classified as apartments or other multi-family units. The BART station vicinity therefore can reasonably be

TABLE 5. RESIDENTIAL BUILDING PERMITS IN PROXIMITY TO THE WALNUT CREEK BART STATION, 1962 TO 1976

Year	Apartments		Single	Duplex		Triplex		Total
	Projects	Units	Residence	Projects	Units	Projects	Units	Units
1962	8	171	1	4	8	2	6	186
1963	6	102	5	12	24	1	3	134
1964	5	57	2	-	-	-	-	59
1965	2	58	2	1	2	-	-	62
1966	1	11	1	-	-	-	-	12
1967	2	98	-	-	-	-	-	98
1968	-	-	1	4	8	-	-	9
1969	1	8	-	-	-	-	-	8
1970	1	4	1	2	4	-	-	9
1971	7	1033	1	-	-	-	-	1034
1972	1	6	1	3	6	-	-	13
1973	1	12	1	-	-	-	-	13
1974	-	-	-	-	-	-	-	-
1975	-	-	3	-	-	-	-	3
1976	-	-	-	1	2	-	-	2
TOTAL	-	1560	19	-	54	-	9	1642
Percent of Total	-	95.0	1.2	-	3.3	-	0.5	100.0

Source: City of Walnut Creek Building Department

categorized as an area that always has experienced medium to high density development. Consequently, the only remaining way of confirming Hypothesis 5 in the Walnut Creek BART station area is by demonstrating that an unusual amount of high density apartment (or condominium) construction occurred in the station area coincidental with the arrival of BART, as would be expected were developers anticipating strong, BART-related market demand in station vicinities.

Except for one unique year — 1971, to be examined more closely below — apartment construction activity from 1968 onward is well below that of the preceding years. Indeed, still excluding 1971, the number of single family detached, duplex, and triplex units constructed from 1968 onward roughly equals the number of apartment units constructed in that time period (28 vs. 30); marginal densities would have had to be decreasing after 1968, not increasing. From a different perspective, Table 6 compares the total number of apartment units built in the station area to the total number of apartment units built city-wide. With 1971 once again excluded, the figures reveal that the BART station vicinity captured the largest share of citywide apartment construction in the early 1960s — long before the initiation of BART service (but after the BART bond issue was approved).

Construction activity in 1971 is thus the only obstacle to rejecting Hypothesis 5. At first glance the figures for 1971 suggest that perhaps BART did have a substantial impact on apartment construction (and hence on densities) within walking distance of the station area. Far more multi-family units were built in 1971 than in all the other years combined. The station area units accounted for nearly 60 percent of all apartment units built in Walnut Creek that year. Since the building permits were issued in 1971, the rent-up period would correspond with the beginning of BART service. In short, the construction activity in 1971 is highly relevant to the testing of Hypothesis 5.

The 1033 apartment units built in the station area in 1971 are located in seven apartment complexes. According to building permit records, four of the apartment complexes have eight units or less. The remaining three complexes have 788, 158, and 56 units. The 788 unit complex, Diablo Keys, deserves attention because it constitutes 75 percent of the station area construction that year. A crucial question arises: Are these units legitimately within walking distance of the BART station? Arguably, the answer is no. Diablo Keys is at least two-thirds of a mile from the BART station, across two major arterials. Two-thirds of a mile probably exceeds a normal walking distance.

The 158-unit complex built by Land West also is located approximately two-thirds of a mile from the station -- again, a long walk. The 56-unit complex at 1800 Cole Avenue is located within easy walking distance of the BART station, as are the remaining four small apartment projects. Even if Diablo Keys and the 158-unit complex are disregarded, more than 80 new units still remain. These units have to be viewed as significant, given their timing and the absence of comparable activity in any other post-1967 year.

To clarify these seemingly ambiguous findings, developers and others familiar

TABLE 6. COMPARISON OF APARTMENT UNITS NEAR THE WALNUT CREEK BART STATION VERSUS TOTAL APARTMENT UNITS CITYWIDE, 1962 TO 1976
(Authorized Permits for Construction)

Year	Apartment Units Near BART	Apartment Units Citywide	Percent Near BART
1962	166	466	35.6
1963	105	399	26.3
1964	57	337	16.9
1965	22	772	2.8
1966	11	94	11.7
1967	98	553	17.7
1968	8	415	1.9
1969	8	725	1.1
1970	4	894	0.4
1971	1033	1777	58.1
1972	13	765	1.7
1973	12	509	2.4
1974	-	328	-
1975	-	114	-
1976	2	298	0.7
TOTAL	1539	8446	18.2
Annual Average	96.2	527.9	18.2

Source: City of Walnut Creek Building Department

with residential construction in Work Element 5 study areas were interviewed. Overall, approximately one-third of the key informants stated that BART has had an impact both on station area and non-station area residential densities, with densities being higher than otherwise would have occurred. Concord, Walnut Creek, Fremont, and Union City were cited as communities most affected. In several instances the developers themselves had increased project densities at least partially because of BART -- e.g., a Fremont project encompassing 350 single family detached houses (still under construction) and a Walnut Creek project encompassing 400 townhouses approximately one mile from a BART station (Bancroft Village).

The developers also were aware of public sector actions regarding station area densities. Fremont in particular was identified as having re-zoned the BART station vicinity to require high density development. Problems arise, however, in that higher density development may not be economically feasible in many station environs. In fact, in Fremont, a specific proposal for high density BART-oriented housing was not formulated until the fall of 1977 mainly because of the weak apartment and condominium market.

This project, a 712-unit residential development called The Hub, currently is undergoing development review. In this case, the developer would have preferred to build at a density of 20-25 units per acre, but the City would not relax its demand for a minimum density of 50 units per acre. However, the parking requirements were reduced by 25 percent, from 2 to 1.5 spaces per unit to reflect access to BART and to compensate for the high costs of underground parking.

High density zoning also tends to raise landowners' expectations, thereby inflating land prices. Other station areas that have been specifically zoned for intense residential development (though not necessarily so intense as to be economically infeasible) include Bayfair, San Leandro, Concord, and Pleasant Hill, and to a lesser extent Walnut Creek, South Hayward, Richmond, and MacArthur. (None of these communities, though, have set a minimum density floor below which new development will not be permitted.)

On the other side of the coin, some BART communities explicitly have prohibited high density development. BART station areas that have been down-zoned include El Cerrito Plaza, North Berkeley, Central Berkeley, Rockridge, and 24th Street in the Mission District (though not all changes were strictly intended to lower residential density).

A number of other factors are working against high density development in BART station vicinities: (1) Local opposition to non-suburban development patterns is precluding higher density development along the Concord line from Orinda outward.[12] (2) Land speculators may be demanding unrealistically high prices for vacant parcels in proximity to BART stations, such that even intense

12. Dennis Dingemans, Residential Subcentering and Urban Sprawl: The Location of Higher Density, Owner-Occupied Housing Around the Concord Line BART Stations (Berkeley, California: Institute of Urban and Regional Development, April, 1977), p. 33.

development cannot be justified in terms of the developers' profit margins. Greater insight will be gained on this issue in the Study of Property Values and Rents (Work Element 13) and Study of Property Acquisition and Occupancy (Work Element 14). (3) Regardless of land prices, a sufficient market may not exist for high density residential projects in suburban locations currently zoned for such development. Developers can offer greater amenity at lower density for the same price. (4) When nearly every household has at least one automobile, rapid transit can no longer have the nucleating effects that it did when people needed to live within walking distance of transit.[13] Apartment dwellers in outlying areas are likely to have as high or higher ratio of cars to employed household members as occupants of single family homes. (5) Too little attention has been given to the complementary facilities required to serve high density residential development adjacent to stations, e.g., the need for complementary commercial services. (6) Environmental restrictions are severe in some station vicinities. The Fremont BART station, for example, is near an earthquake fault. (7) In the opinion of one Fremont developer, excessively high developmental fees imposed by the City on all new residential construction are precluding development. (8) Finally, outlying station areas themselves are not that attractive for residential development because of the ambiance created by the large BART parking lots and related traffic congestion.

Everything considered, BART has not induced significant increases in residential densities within walking distance of BART stations. The best evidence in support of Hypothesis 5 is found in the 1971 apartment construction activity around the Walnut Creek BART Station, and the proposal for high density housing at the Fremont Station, but isolated incidents are not sufficient to verify a definite BART impact on station area residential development to date. The Fremont project is worth monitoring to see what kind of a market exists for such housing.

IMPACTS ON BART SERVICE CORRIDORS

HYPOTHESIS 6. Residential developers tend to locate new housing and apartments away from areas in which BART produces noise, visual, and other adverse environmental impacts.

The adverse environmental effects of BART, mainly train noise, have influenced residential development along the Fremont line, but these impacts are limited geographically to a narrow zone adjacent to at-grade and elevated BART tracks.

The Environment Project of the BART Impact Program examined impacts on air quality, the natural environment, the visual quality of communities traversed by above-ground BART trackage, aggregate noise levels, and other envi-

13. Henry Bain, New Directions for Metro: Lessons from the BART Experience (Washington, D.C.: Center for Metropolitan Studies, 1976), p. 22.

ronmental effects.[14] Based on these research efforts, noise generated directly by BART is the only adverse environmental impact that may have significantly affected residential developer decisions. Thus, the testing of Hypothesis 6 focused on noise impacts.

As discussed in Chapter 2, BART's excessive noise impacts extend a maximum of 250 feet from the tracks, and community noise levels often exceed BART's noise level even within this area. In Daly City, Richmond, and Walnut Creek, community noise levels equal or exceed BART, so the theoretical conclusion would be that BART noise is no deterrent to residential construction near the BART line. While community background noise or freeway roar and BART train noise are not precisely comparable, in these areas the effect of BART's noise on development decisions cannot be tested. The only portion of Work Element 5 study areas where BART noise clearly is the controlling factor is the BART line segment from one-half mile south of the South Hayward BART station to a point just north of the Fremont BART station. This stretch, just over six miles long, is the test for Hypothesis 6 (see Figure 4). Even here, only a mile of BART track does not adjoin the Western Pacific Railroad and little land is available for residential development. All told, about 2 miles adjacent to BART are available for development.

According to 1965 aerial photographs, the only parcels available for development within the impacted corridor are located within the vicinities of the Union City and Fremont BART stations. Based on a comparison between 1977 and 1965 aerial photographs, no residential development has occurred on the few available parcels. A 187-unit mobile home project was built south of the South Hayward BART station, but the project is not within the excessive noise cordon. Interviews with the project owner and on-site manager confirm that BART-generated noise is not a problem.

Union City and Fremont have been growing at a rate that would seem likely to cause some amount of residential development in the impacted corridor. Is the absence of development in the corridor due to BART noise? Representatives of five developers interviewed -- Shappel Industries, Braddock and Logan, Hoffman Brothers, Morrison Homes, and Presley Company -- were influenced. Problems stemming from BART-generated noise have a number of facets. Presley Company stated that Federal Housing Administration's (FHA) resistance to insuring home loans in noise impacted areas caused the company to turn down a parcel near elevated trackage. At the state level, the one mandated standard is that new multi-family structures constructed within a 60 dB (CNEL or L_{dn}) noise exposure contour must have special noise insulation to reduce interior sound levels to 45 dB. The developer is required to engage a noise consultant to assure attainment of the 45 dB level. Since 1972, the State of California also requires cities and counties to adopt a noise element as part of their general plan. The Office of Noise Control within the State Department of Health

14. Gruen Associates, Inc., and DeLeuw, Cather & Company, Environmental Impacts of BART - Interim Service Findings (Springfield, Virginia: National Technical Information Service, January, 1976).

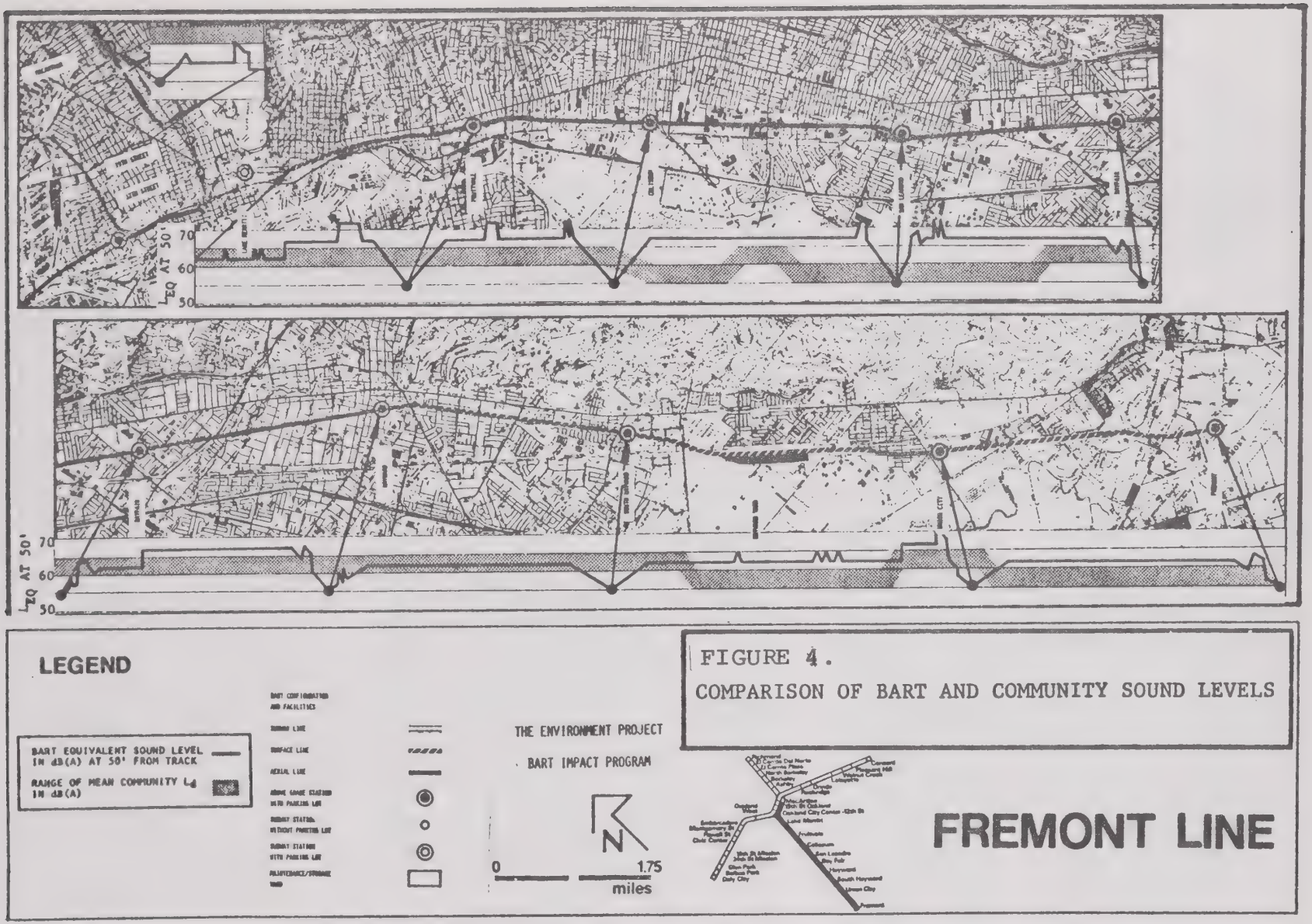


FIGURE 4.
COMPARISON OF BART AND COMMUNITY SOUND LEVELS

SOURCE: BOLT, BERANEK, & NEWMAN, INC. ACOUSTIC IMPACTS OF BART: INTERIM SERVICE FINDINGS. SAN FRANCISCO. BART IMPACT PROGRAM, 1976

has issued noise standards, but local jurisdictions are free to adopt more restrictive or less restrictive noise standards for different land uses. According to one interviewee at Braddock and Logan, such standards usually can be met for noise coming from roadways simply by building a high noise barrier wall, but a noise barrier wall for elevated BART trackage would not be feasible.

Developers thus can find themselves faced with a myriad of regulations in noise impacted areas. Compliance efforts can be costly, ranging from fees paid to noise consultants, to costs incurred during delays for project reviews, to total write-offs if a project is not approved. Reluctance to become involved with properties in BART noise impact zones is understandable.

The quantitative data relevant to Work Element 5 study areas are insufficient to confirm or deny Hypothesis 6. However, the absence of development within noise impacted areas and developers' comments strongly suggest the validity of Hypothesis 6. Though not all developers are dissuaded from purchasing and developing noise impacted properties, the decisions of at least some developers have been influenced by BART's adverse environmental effects — specifically noise.

HYPOTHESIS 7. Residential developers tend to locate new housing and apartments near BART in response to attitudes and expectations generated by BART planning and publicity.

From its inception BART has received extensive media coverage, much of it as a result of BART Board and staff efforts to stimulate desired development. The reactions of developers and public officials influential in shaping Bay Area growth were mixed; some felt BART would not affect metropolitan development, others adopted a wait and see attitude, while still others began serious investigations into development opportunities associated with BART. Prior to the initiation of BART service, newspaper articles were reporting that "a considerable number of individuals and firms are betting large sums of money on what the impact of the Bay Area Rapid Transit system will be at various locations in the East Bay."[15] Now that BART has been in service for five years, it is appropriate to ask whether attitudes and expectations generated by BART planning and publicity affected the locations of residential projects.

Overall, Hypothesis 7 has been confirmed by about 50 percent of the developers interviewed but denied by the other 50 percent. The developer responses cannot be disaggregated geographically (i.e., all Pittsburg-Antioch developers respond to a given question affirmatively while all Union City-Fremont developers respond negatively), because developers operating in the same locale gave conflicting responses. Developer observations in three topical areas deserve attention.

First, roughly 50 percent of the interviewees believed that BART had affected supply-demand factors for housing in BART station areas. The perceived impacts took the form of increased property values, increased densities, an over-building

15. Lon M. Carlston, "BART Impact Even Stronger," Oakland Tribune (April 18, 1971).

of units and a corresponding increase in vacancy rates. References to increased vacancy rates were based on experience in Fremont and Walnut Creek, and to a lesser extent in Concord and San Leandro. The developers may have been thinking about only one or two projects (e.g., the 788-unit Diablo Keys apartment complex in Walnut Creek) because vacancy data published by the Northern California Real Estate Research Council do not completely confirm the observations.[16] In these communities the percentages of idle residential Pacific Gas & Electric Company meters has remained relatively constant since 1970, fluctuating from 0.5 percent to 1.8 percent. Regardless of actual net impacts on vacancy rates, half the developers did feel that the demand for residential units in station areas was higher than would have been the case without BART.

Second, nearly two-thirds of the developers stated that BART was somewhat important in their decision-making, but less than one-third said that BART influenced the location of one or more residential projects. (Table 3 presented summary findings on these projects under Hypotheses 1 and 2.) BART would appear to be a paramount factor only rarely, if ever. Some developers were adamant that other factors completely eclipse BART -- for example, the growing scarcity of "buildable land" in the Bay Area (buildable land being defined as having appropriate zoning, water, and sewer hook-ups).

Third, irrespective of past experience, half the developers would pay a premium of $500 to $5000 per unit for developable land within a BART station area. One developer was willing to pay 100 percent more per acre for land close to BART than for comparable parcels not in proximity to BART. However, the developers generally felt that residential land prices around BART stations were out of line with rents believed obtainable. That is, if the market demand for apartment units near BART were, say, $250 per apartment per month, the developers believed that too large a portion of the $250 would have to go toward land costs, thereby reducing the potential profit or even creating a short-term loss. Apparently BART has induced higher asking prices in station vicinities, but those higher prices may have caused the land to become unmarketable. The Study of Property Acquisition and Occupancy (Work Element 14) should clarify the extent of speculation attributable to BART.

In the end, BART planning and publicity appears to have influenced half the study area developers, but mainly within the context of BART being only one of many decision-making factors.

16. Based on idle residential Pacific Gas & Electric Company meters, as documented in Northern California Real Estate Research Reports, 1962-77.

4. CONCLUSIONS AND IMPLICATIONS

To summarize the findings of Work Element 5:

- Single family housing construction in Pittsburg-Antioch and multi-family construction in Fremont-Union City is somewhat greater than it would have been without BART, according to analysis of building permits and developers interviews.

- BART has not induced significant rehabilitation and redevelopment in older neighborhoods adjacent to study area BART stations.

- BART's adverse environmental impacts, specifically noise impacts, have caused some residential developers to avoid sites adjacent to BART tracks, but this impact is limited to a 250 foot wide zone and mainly occurs where BART noise exceeds community noise levels. Only about 10 percent of the land adjacent to the BART trackway (7 miles) is exposed to such noise impacts.

- BART has not induced residential construction within walking distance of study area BART stations at a higher density than would have occurred without BART.

- Some residential developers have tended to locate new housing and apartments near BART in response to attitudes and expectations generated by planning and publicity, but the amount of housing built in response to BART is a small proportion of the total.

Overall, the findings of Work Element 5 undermine previous expectations regarding impacts that BART was to have had on the Bay Area housing industry. Expected BART impacts would include the clustering of residential development around carefully selected BART station sites (Hypothesis 7), the clustering of residential development at densities otherwise unlikely (Hypothesis 5), and the rehabilitation of declining, predominantly central city residential neighborhoods adjacent to BART stations (Hypotheses 3 and 4). None of these impacts have materialized.

Instead, to the extent that BART has had impacts on the Bay Area housing industry, the impacts have been largely unexpected. Noise from BART facilities has deterred residential development in some areas (Hypothesis 6). BART has not tended to limit residential spread or induce higher densities in built-up areas; instead, BART has stimulated growth on the periphery by bringing central employment locations within commute distance of workers who cannot afford low density housing closer to the center (Hypotheses 1 and 2).

On the other hand, BART may not have been in operation long enough to generate the originally anticipated higher densities and rehabilitation near stations -- an issue deserving further attention.

Several communities, notably Fremont, Concord, and Hayward, have zoned land adjacent to BART stations for high density development. Such development has not yet occurred, but sooner or later the economics will be favorable and developers will be attracted to the sites. (Strictly speaking, this would not be an impact solely or even mainly attributable to BART given the shortage of buildable sites zoned for such use.) Similarly, rehabilitation around central city BART stations may well occur in the future. The City of Richmond has the ability to take direct action because the station is adjacent to a 107-acre redevelopment area. Significant developmental actions in the not-so-distant future are probable; indeed, some parcels are already being sold.

Nearly one-third of the developers interviewed concur with these observations. They fully expect, for example, that Fremont will experience intense residential development adjacent to the BART station, and a high density project, in fact, was proposed in December 1977. They argue that as time goes on developable land within reasonable commute distance of downtown San Francisco and Oakland will become very scarce -- and land near BART stations will become attractive no matter what the restrictions. One developer envisions a near-term scenario in which the fringe of the metropolitan area has been extended so far that commuters drive 20 miles to board BART at Concord, after which they face a 30 to 40 minute trip segment to downtown Oakland or San Francisco. When confronted with such a commute, many households may choose a higher density residential complex located considerably nearer a BART station.

Comparison with the No-BART Alternative -- the MTC-defined regional bus system that might have existed in the absence of BART — showed that BART's greatest impacts occurred where the most significant gains in accessibility and mobility were offered to those working in downtown San Francisco and Oakland, and where local land use policy facilitated residential development. To the extent that BART represented a major commitment to regional transportation, it prompted some developers to build for a BART-oriented market, taking advantage of station area zoning incentives. This might not have happened under the NBA because no new transportation facilities would have been built. However, at a regional scale, housing patterns under the NBA would not have been markedly different because BART is a relatively unimportant factor in the suburbanization, mainly affecting timing and location decisions.

Many expected land use and urban development impacts may still be years away and will only be quantifiable after years of full, seven day service. Nonetheless, the limited land use impacts noted so far suggest that the case for rail rapid transit based on its urban form-making potential cannot be made easily. Planners and decision-makers contemplating similar fixed rail rapid transit investments would be well advised to re-evaluate their expectations for transit-induced changes in light of Work Element 5 findings to see whether they will be offering sufficient incentives to influence housing industries and thus regional growth and development patterns.

POLICY IMPLICATIONS

The findings of this study of BART's effects on the housing industry suggest the following policy implications.

First, rail rapid transit by itself will not cause residential development to cluster around suburban stations. Supportive land use policy is necessary. More importantly, if local communities desire development, they should negotiate zoning and other conditions of approval with developers to make transit-oriented development feasible from an economic standpoint. As examples, relaxing parking space requirements and sharing costs for pedestrianways to facilitate station access represent two possible concessions that might lower a developer's costs sufficiently to make a station-area project viable and attractive from a marketing perspective.

Second, high density zoning intended to encourage private redevelopment and intensification of use in residential neighborhoods rarely creates sufficient incentives for transit-oriented development when market forces do not make it economically feasible. Such policies probably should be limited to areas of substantial housing deterioration and blight. But even in these cases, well funded neighborhood conservation programs or public redevelopment may be preferred, and should be justified on the basis of social, economic, and environmental policies and objectives, not just as a transit-supporting land use policy.

Third, planners and decision-makers should not expect any transit-oriented development, even under optimistic assumptions, until after construction has begun. Most developers will wait for the opening of service. In anticipation of this, opportunities for cooperative land use planning and development programming should be pursued during the early planning stages.

Fourth, the impacts of train noise should be reflected in local land use and zoning policies by establishing buffer zones along at-grade and aerial trackways through residential areas, or requiring installation of barriers or other mitigation measures. Routes through non-residential areas or within shared rights of way should be favored from a land use planning perspective. In fact, given the increased awareness of noise today and the requirements of environmental review and noise abatement legislation, noise impacts are likely to be scrutinized far more carefully in future transit planning than they were during the initial BART planning and design.

Finally, because rail transit may affect corridor development trends to some extent, local communities should be encouraged to adopt growth management strategies to avoid school impaction or overloaded public services and facilities resulting from unanticipated increases in housing construction. Although this was not an impact specifically attributed to BART in any of the communities studied, it could become an issue elsewhere, particularly if service began in a strong housing market. (BART's opening of service coincided with the 1973-74 recession which significantly depressed housing construction.)

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APPENDIX A. KEY INFORMANTS INTERVIEWED

Realtor/Developer	Firm	Area
Mr. Bakar	Standard Builders	Daly City/Pacifica
Ken Earp	Earp Construction/Realty	Hayward
Joe Fitspatrick	U.C. Construction	Daly City/Pacifica
Ralph Garrow, Jr.	Garrow Properties	Antioch
John Hughes	Braddock & Logan	San Leandro
Bill Lenard	Hoffman Homes	Antioch/Pittsburg/Concord
Art Nattingham	Gentry Homes	Fremont
Mr. Pardini	Perma Built Homes	Central & East Contra Costa County
Steve Schott	Citation Homes	Fremont
Tom Seeno	A. Seeno Company	Pittsburg/Antioch
Roy Vance	Kaufman & Broad	Pittsburg/Antioch
Walnut Ck. Sls. Mgr.	Heyman Homes	Walnut Creek
Bill Watson	Presley Company	Fremont
Carlos Zocci	Zocci Company	Antioch/Pittsburg/Concord
Hal Thomas	Systech Corporation	Walnut Creek
Al Marcotte	Marcotte Brothers	Hayward
Donna Schoessow	McKeon Construction	Union City/Fremont
Dick Randall	Williams Lyon Company	Southern Alameda County
Dudly Frost	Morrison Homes	Southern Alameda County
Jim Gilmetti	Shappel Industries	Southern Alameda County
Harvey Kameny	Crocker Homes	Antioch/Fremont
L. B. Nelson	L.B. Nelson Company	Southern Alameda County
William Schorer	Great American Land Co.	Fremont

Apartment Manager	Development	Area
Edna Beason	Greenwood Apartments	Walnut Creek
Chuck Beebe	El Pomar Trace Apartments	Fremont
Mr. Bettencourt	Stoneridge Apartments	Walnut Creek
Dixie Brisbin	Todd Estates Apartments	Walnut Creek
Jerry Brownlow	Laurel Manor	Fremont
Al Elder	Oceanhill Apartments	Pacifica
Ms. Gallagan	Lakeview Apartments	Fremont
Verda Luthey	Diablo Keys Apartments	Walnut Creek
Mike Mantor	Points West Apartments	Pacifica
Doris Read	Spanish Ranch #2	Hayward
Ms. Nevela	Whitecliff Village	Richmond
(Name not given)	Country Club Apartments	Daly City
Louis McFarlane	Sylvester Apartments	Mission District
Mr. McLard	700 Church	Mission District
Robert Halsing	Vicentian Villa	Mission District
John Bourne	Apts. de la Esperanca	Mission District
John Bourne	Bethel Apartments	Mission District
Fred Colland	Capri Tower Apartments	Mission District
Tony Martorana	El Capistrano	Mission District

Woodrow Mechan	1065 South Van Ness	Mission District
Wilma Reisinger	City Center Tower	Oakland
Rosana Moore	Barrett Terrace	Richmond
Paul Peterson	Whitecliff Village	Richmond

Planning Official	Title	Agency/Area
Gary Binger	Director	Walnut Creek Planning Department
John Walker	Director	Daly City Planning Department
Chuck Woodward	Director	Richmond Planning Department
Red Kernan	Deputy Executive Director	S.F. Redevelopment Agency
Norman Lind	Director	Oakland Planning Department
David Hoard	Director	Oakland Community Development Agency
Rai Okamoto	Director	S.F. Planning Department
Michael Kaplan	City Architect	Oakland City Architecture Department
Tom Hirshfeld	Chief of Real Estate	Richmond Redevelopment
Al Jones	Chief, Planning and Operations	Richmond Redevelopment

Financier	Savings Institution	Area
Kenneth Berndt	Central Bank	El Cerrito
Peter Crosby	United California Bank	Oakland
Robert Anderson	Citizens Savings & Loan	San Francisco
Frank Shaw	Crocker National Bank	San Francisco
Elwood Hansen	Bay View Federal Savings & Loan	San Francisco

Other	Affiliation	Area
Paul Peterson	Owner, Whitecliff Homes	Richmond
Charles Harris	Real Estate Broker	El Cerrito
Chuck Durand	Building Inspector	Antioch
Monte Florence	Realtor/Planning Commissioner	Hayward
Toby Levine	Mission Planning Council	Mission District
John Marziano	Manager, Pacific Bay Real Estate	Richmond
Noboru Nakamura	Architect/Planner	Oakland
Dene Ogden	Real Estate Appraiser	Oakland
Raymond Haymon	Grubb & Ellis	Oakland
Gloria Ramos	Architect/Builder/ Contractor	San Francisco
Mackey Salazar	Attorney/Building Owner	San Francisco
Ben Ramos	President, Mission Economic Development Association	San Francisco

Lee Soto	Director, Arriba Juntos	San Francisco
Martin Del Campo	Architect	San Francisco
Ed McKeegan	Former Mayor, City Councilman	Richmond
Frank McCullogh	Owner, McCullogh Chevrolet	Hayward
Nathaniel Bates	Former Mayor, Councilman	Richmond
James McMillian	Pharmacist	Richmond
William Evans	Management Services Corp.	Richmond
Mary Widener	Businesswoman	Oakland
Oscar Perez	Spanish Speaking Unity Council	Oakland
B. T. Anderson	Minister	San Francisco
Sister Caroline	Our Lady's Home for the Aged	Oakland
Connie Ferry	Property Management Assoc.	Oakland
Mr. Devlin	Building Inspector	San Francisco (Mission)
James Blyler	Planner, Community Development	Oakland
Martin Storm	Planning Department	Hayward
Robert Smith	Building Department	Daly City
Gerald Rasmussan	Planning Department	Richmond
Mr. Narlaez	Building Department	Richmond
Harley Goldstrum	Planning Department	Walnut Creek
Les Foley	Planning Department	Walnut Creek
Bruce Dotson	Planning Department	Fremont

APPENDIX B. DEVELOPER INTERVIEW FORM

Interview of Developers

(In person or telephone, depending on size and location of project(s) and the individual's or firm's experience in the BART service area.)

Developer: _____

Introduction: JBA is under contract with the federal government to investigate changes in land use and urban development caused by rail transit systems as compared with bus transit. One aspect of our study is to examine changes in the housing industry and development trends since 1962 and then try to determine what part of the change is attributable to BART. We would like your help in learning about specific projects that you (or your firm) were involved with in (mention study areas: Central Contra Costa County, Pittsburg-Antioch, Southern Alameda County, Daly City-Pacifica). We would like to ask you a few questions about your experience. It will take about 15-20 minutes. (If this is not a good time or the right person, arrange to call back, accept collect call, or set tentative time -- subject to confirmation -- to conduct an in-person office interview.)

Information that you give me will not be used in our report to identify your project(s) unless you agree. You can say okay now, or I'll ask again when we have finished talking. _____

1. Could you briefly describe the method of operation of your firm:

   _____ Developer -- buy land for early development; build housing.

   _____ Developer -- develop land and sell sites to others for construction.

   _____ Buy land considerably in advance of development.

   _____ Handle own sales or contract with sales organization. If so, which organization? _____

   _____ Other: _____

   _____

2. What major projects have you (your firm) completed in (mention study area(s)) since 1965? By major project we mean those over 100 units.

(Continued on next page)

Name	Location	Size (Units)	Density and/or dwelling types	Price Range	Date of Completion
1.					
2.					
3.					
4.					
5.					

NOTE: IN SOME CASES, the interviewer already will have the name of one or more projects that will be discussed with the developer and this background information will not be needed.

3. What factors did you consider in deciding to build (name of project, repeat for each major project mentioned if possible)? If possible, could you rank the factors in order of importance.

PROJECT 1 _____

PROJECT 2 _____

PROJECT 3 _____

PROJECT 4 _____

4. Did you consider any alternatives to your proposed development plan for (name of project near a BART station or other major project)? Specifically, did you look at other sites? different densities or mixes of housing types? price ranges? timing?

	Location	Density	Price	Timing	Other
PROJECT 1					
PROJECT 2					
PROJECT 3					
PROJECT 4					

5. Did BART have any influence on your project(s)' location _____, density _____, price range _____, timing _____? Could you explain how. (Probe)

6. Could you rank BART as a factor in your decision making?

Very important _____ Some value _____ Unimportant _____

7. What was the market response to each project? (Months to sell out may not be remembered — may get answers like good, slow, etc.)

PROJECT 1 _____

PROJECT 2 _____

PROJECT 3 _____

PROJECT 4 _____

8. Do you think the availability of BART had any effect on the rate of sales?

_____ If so, can you give us some examples _____

9. Where did your purchasers formerly live? _____ San Francisco _____ Oakland

_____ Other East Bay.

10. Can you estimate the three most popular work locations where people living in your project(s) work?

PROJECT 1: 1. _____ 2. _____ 3. _____

PROJECT 2: 1. _____ 2. _____ 3. _____

PROJECT 3: 1. _____ 2. _____ 3. _____

PROJECT 4: 1. _____ 2. _____ 3. _____

11. About what percentage of people living in your project(s) use or expected to use BART?

____ PROJECT 1; ____ PROJECT 2; ____ PROJECT 3; ____ PROJECT 4

(Their knowledge will depend on completion date.)

12. How did you advertise? Did you mention proximity to BART?

PROJECT 1 _____

PROJECT 2 _____

PROJECT 3 _____

PROJECT 4 _____

13. (If proximity to BART advertised) Do you recall whether your salesmen noted any interest due to ads mentioning proximity to BART? _____

_____

14. Did your sales organization keep any data on characteristics of buyers or prospects that could be available to us? (We would maintain confidentiality if requested.) Of particular interest would be:

    Former residential location _____

    Workplace of primary wage earner _____

    Workplace of secondary wage earner _____

    Stated reason for housing search in _____ (city or community)

    Stated reason for interest in particular development _____

    Any information that would indicate prospect or customer's interest in or intent to use BART _____

Now I'd like to ask several questions about residential development in (mention study area(s)).

15. Thinking about recent development adjacent to the BART line, can you recall any instances when a developer's decision was influenced by potential adverse effects of BART, such as train noise? _____
    Did you know of any landowners who have had trouble selling for development because of proximity to BART? _____

16. Around the (study area) BART station, can you think of any projects that were built at higher densities than originally planned because proximity to BART was viewed as an asset? Or were land costs so high that higher densities were required to build at a profit? In the absence of BART do you think demand for apartments at that site would have been the same?

    _____

    _____

17. Has the Concord BART line served to further generate low density, single family home development in Antioch? _____

18. Has BART affected the absolute level of housing supply and demand in the Antioch area or simply caused intra-city shift? _____

19. Did developers overanticipate BART's effect on local housing demand or misguage the start of BART service, thus over-building and driving the vacancy rate up? _____

20. Assuming you were contemplating an apartment project in ( ), what additional land cost per acre would a location near BART be worth?

_____

21. Are residential land prices around the ( ) BART station in line with rent premiums believed obtainable? _____

22. Do local banks/savings and loans associations regard proximity to BART as an important factor when considering a construction loan for a development proposal near the ( ) BART station? _____

APPENDIX C. RENTAL HOUSING MANAGER INTERVIEW FORM

Interview of Rental Housing Managers from Ads Mentioning BART

(Designed for telephone use)

Project _____ Location _____

Ad statement (media; frequency of appearance; relative emphasis on BART vs. other amenities) _____

Phone _____ Ask for manager (name) _____

This is _____. I am working on a study funded by the federal government to determine whether BART has had an influence on the location of apartments in the Bay Area. We notice that your advertising calls attention to BART and I would appreciate your answering a few questions about this. It will take about 15 minutes. (If this is not a good time or right person, arrange to call back, accept collect call, or set tentative time — subject to confirmation — to visit site).

Information you give me will not be used in our report to identify your development unless you agree. You can say okay or not okay now, or I'll ask again when we have finished talking. _____

1. Do persons inquiring about rentals mention BART:
   _____ Often? _____ Occasionally? _____ Rarely?

2. Have you made any surveys of BART usage by your tenants? If yes, please describe. (Could you send a copy, or tell me who could?)

3. May I ask several questions about the tenants in your development?

   _____ About what percent are working singles living alone?

   _____ About what percent are couples with both persons employed?

   _____ About what percent are couples with one person employed?

   _____ About what percent of units are occupied by retired persons?

   _____ About what is the average length of stay? (If reluctant, or don't know, try to get some notion of turnover. How many have been there since opening? When did you open? Are all on lease? etc.

4. Can you estimate the three most popular work locations based on the share of your residents employed at those locations? 1. _____ 2. _____ 3. _____
   _____ Has this been changing during recent months or the last several years?
   _____ Do you know why? _____
   _____

5. _____ About what percent of those working have a car available to drive to work?

_____ About what percent of those working use transit?

_____ About what percent of all employed residents use BART?

Is BART's share increasing _____, staying about the same _____, or decreasing _____? Do you know why? _____

6. How do BART riders usually get to BART (number or percentages if possible)?

_____ Walk

_____ Shuttle bus operated by apartment complex (where applicable)

_____ Public bus system

_____ Drive car, ride with someone, or are dropped off

_____ Ride bike

7. _____ What is your rental range?

8. What is the mix of units: _____ studios, _____ one bedroom, _____ two bedroom, _____ three or more bedroom.

What other amenities are provided? (pool, sauna, health club, etc.)

_____

9. _____ When was the development opened?

_____ Do you know whether the decision to build was based on BART service?

10. How has BART affected the success of (name of development) ?

_____ For example, would rents be lower, or vacancies higher, or turnover greater without BART?

_____ Or would rents be higher, vacancies lower, or turnover lower if BART service were better? _____ If so, have you had tenants move out saying the BART commute was harder than they had expected?

11. _____ If shuttle bus is operated by development, is it free to tenants?

_____ If not, does the charge cover the operating cost? _____ What is charge?

_____ About how many passenger trips total are made on the shuttle bus on a working day? (If manager does not know detail, ask if it is possible to talk to bus manager or driver.)

12. _____ Are there any plans to expand or reduce the shuttle bus service to BART?

Interviewer: _____

Date: _____

APPENDIX D. BUILDING INSPECTOR INTERVIEW FORM

Name _____ Telephone _____

City _____

Years of experience _____ (Designed for Telephone Use)

Objective of the Study: To examine rehabilitation trends in selected neighborhoods over the past 15 years, and to relate these to BART. Focus is on major renovation and upgrading, not normal maintenance, plumbing or electrical work.

1. Thinking back to the 1960s, how frequently were homes and apartment buildings being bought to be fixed up in _____ neighborhood as opposed to other, similar neighborhoods? _____ What types of investors were going into these neighborhoods and how successful do you think they were?

   _____

2. Since BART construction began, did you notice a change in rehabilitation activity within the station area, that is within 1500 feet of the station? What do you think caused that change? _____

   _____

3. After BART opened in 1972(3) did you notice any further change in rehabilitation near the station as opposed to neighborhoods further away (1 - 3 miles)? _____ Would you say that more or less rehabilitation is occurring near the BART station and, if so, do you think any of it is related to BART? _____ Why? _____

   _____

4. Could you give me any specific examples of residential buildings that you think were renovated to take advantage of a BART market, that is as places for BART commuters to live within walking distance of a station? _____

   _____

   (Name, location, year, type of building)

   _____

   _____

Interviewer: _____ Date: _____ For Attribution:

APPENDIX E. RESIDENTIAL CONSTRUCTION TRENDS IN SELECTED AREAS

DISTRIBUTION OF SINGLE FAMILY AND MULTI-FAMILY HOUSING CONSTRUCTION

WITHIN THE SUBURBAN COUNTIES SERVED BY BART, 1962-1977

Number of Units Authorized by Building Permits and Share of Total
in Alameda, Contra Costa, and San Mateo Counties, excluding Oakland

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
SINGLE FAMILY																
Daly City (units)	319	229	191	637	69	191	241	225	237	443	1395	273	129	195	168	119
(percent)	2.9	1.8	1.6	5.4	0.9	2.6	2.5	2.7	2.9	3.1	10.7	2.7	2.0	2.6	1.6	0.8
Pacifica	328	693	768	314	191	374	253	113	76	239	542	146	78	13	35	59
	3.0	5.4	6.4	2.7	2.6	5.0	2.6	1.3	0.9	1.7	4.2	1.4	1.2	0.2	0.3	0.4
Fremont/Union City	2204	1833	1214	1083	484	986	936	1392	2215	3136	2115	1122	1002	1080	1328	1871
	19.9	14.4	10.2	9.3	6.5	13.2	9.7	16.5	27.3	22.2	16.3	11.1	15.4	14.2	12.4	13.1
Hayward	59	182	231	284	48	64	94	75	371	364	231	389	148	122	252	116
	0.5	1.4	1.9	2.4	0.6	0.9	1.0	0.9	4.6	2.6	1.8	3.8	2.3	1.6	2.4	0.8
Walnut Creek	439	299	599	479	384	482	503	353	157	503	539	278	277	226	410	701
	4.0	2.4	5.0	4.1	5.2	6.4	5.2	4.2	1.9	3.6	4.2	2.8	4.2	3.0	3.8	4.9
Pittsburg/Antioch	167	258	310	375	322	421	659	479	363	1054	1228	480	465	1038	707	2292
	1.5	2.0	2.6	3.2	4.3	5.6	6.9	5.7	4.5	7.4	9.4	4.7	7.1	13.6	6.6	16.1
SUBURBAN COUNTIES (units)	11080	12746	11943	11701	7459	7474	9610	8449	8114	14157	12993	10125	6517	7632	10732	14238
MULTI-FAMILY																
Daly City (units)	198	476	993	868	143	74	225	223	186	122	448	793	56	183	175	184
(percent)	1.7	3.1	7.0	8.3	3.3	1.8	4.4	2.8	1.5	0.7	3.1	9.5	2.6	11.4	6.0	4.4
Pacifica	171	198	221	147	20	4	0	0	176	391	532	72	0	2	0	206
	1.5	1.3	1.6	1.4	0.5	0.1	--	--	1.4	2.3	3.7	0.9	--	0.1	--	5.0
Fremont/Union City	244	641	302	534	73	173	761	1301	940	2182	2079	523	174	106	436	386
	2.1	4.2	2.1	5.1	1.7	4.1	14.9	16.2	7.5	12.9	14.5	6.3	8.0	6.6	14.8	9.3
Hayward	743	1423	1344	478	179	349	238	257	540	350	595	722	49	102	205	207
	6.5	9.4	9.5	4.6	4.1	8.4	4.7	3.2	4.3	2.1	4.2	8.7	2.3	6.4	7.0	5.0
Walnut Creek	513	493	1734	1601	265	549	415	725	894	1909	765	519	328	114	300	130
	4.5	3.2	12.3	15.3	6.1	13.1	8.1	9.0	7.1	11.3	5.3	6.2	15.1	7.1	10.2	3.2
Pittsburg/Antioch	86	126	130	148	270	49	65	400	339	610	366	216	50	42	135	542
	0.8	0.8	0.9	1.4	6.2	1.2	1.3	5.0	2.7	3.6	2.6	2.6	2.3	2.6	4.6	13.1
TOTAL (units) SUBURBAN COUNTIES	11488	15174	14118	10491	4369	4181	5101	8049	12484	16906	14341	8331	2172	1600	2939	4133